

3 Our Digital Age: Implications for Learning and Its (Online) Institutions

The Challenge

This book does not promote change for the sake of change. Implicit in its sincere plea for transformation is an awareness that the current situation needs improvement. In advocating change for learning institutions, this book makes assumptions about the deep structure of learning, about cognition, about the way youth today learn about their world in informal settings, and about a mismatch between the excitement generated by informal learning and the routinization of learning common to many of our institutions of formal education. This book advocates institutional change because our current formal educational institutions are not taking enough advantage of the modes of digital and participatory learning available to students today.

Chapter 2 focused on learning institutions that are being predicated on and fashioned around the engagement with digital technologies; this chapter considers the shifts in learning premises and practices prompted by an engagement with such technologies.

Youth who learn via peer-to-peer mediated forms may be less likely to be excited and motivated by the typical forms of learning than they were even a decade ago. Conventional modes of learning tend to be passive, lecture driven, hierarchical, and largely unidirectional from instructor to student. As Wheat (log-on name) notes on the Institute for the Future of the Book Web site, “open-ended assignments provide the opportunity for creative, research-based learning.”¹ Yet, in the vast majority of formal educational settings, partly as a concomitant of cut-backs to education resulting in increased class size and partly a function of contemporary culture obsessed with testing, multiple-choice tests have replaced research papers or more robustly creative group-produced projects.

On the K–12 level (primary and secondary public schools), governmentally mandated programs, including those such as NCLB,² overwhelmingly reinforce a form of one-size-fits-all education based on standardized testing. Are *cloned learning*, *cloning knowledge*, or *clones* the desired products? Such learning models—or *cloning cultures*³—are often stultifying and counter-productive, leaving many children bored, frustrated, and unmotivated to learn.⁴

Close to 35% of those who begin public schools in the United States drop out before graduating.⁵ Of special urgency is the surging gap between the wealthy and the poor, a gap that correlates in both directions with educational levels.⁶ Youth from impoverished backgrounds are statistically most likely to drop out of school; high school dropouts earn less than those with a diploma, and significantly less again than those with a university degree. Incarceration rates, which have soared more than tenfold since 1970, also correlate closely with educational failure and impoverishment. Seventy-five percent of those imprisoned are illiterate, earning less than \$10,000 per year at the

time of arrest.⁷ Currently, according to Human Rights Watch, America has the highest incarceration rate of any nation, with 762 of every 100,000 U. S. residents currently in jail (compared with incarceration rates in the United Kingdom of 152 per 100,000 residents, and, in Canada and France, 108 and 91, respectively).⁸

In the United States, incarceration correlates with poverty, and digital access correlates with educational opportunity and wealth. The *digital divide* is not just an old concept but a current reality. Access to computers remains unevenly distributed. Even the most basic resources (including computers) are lacking in the nation's most impoverished public schools, as well as in the nation's poorest homes.

Wealth, formal education, race, and gender are important interacting factors in the certification of what constitutes *merit* and *quality*. Nevertheless, despite the digital divide, there is a generational shift in learning happening by those both living above the poverty line and those more impoverished youth accessing such media in more limited form (often through community centers and libraries). An increasing number of people born after 1983 (the advent of the desktop computer) and 1991 (the advent of the Internet) learn through peer-to-peer knowledge networks, collaborative networks, and aggregated private and open-source social spaces (from MySpace and Facebook to delicious).

Given that the entering college class was born in 1989, this cultural change in learning touches every aspect of the educational system, as well as informal learning environments for all ages. The so-called Millennials are, in fact, not the only age group being transformed by digital technologies. The average age of a *World of Warcraft* game player is 28.⁹ *Born again* has much more than religious resonance.

Because of the Internet, more and more choices are available to the public, in everything from consumer products to software, social networks, modes of play, knowledge and data repositories, and cultural archives. Learning, too, has a “long tail,” where more and more is available virtually, to potentially much wider, more distributed, and diverse ranges of people. This book does not solve these massively complex social issues, nor does it explain the relationships between and among these various developments. However, the opportunity exists to mobilize educators to more energetic and productive learning ends. Interactive technologies and collaborative learning have inspired enormous excitement, and contemporary youth exhibit great facility in negotiating the use of new media. Learning institutions can be developed to do a better job of enlisting the imagination of youth and to use the excited and specialized interests of young people for the purposes of placing in practice wise and rigorous forms of knowledge sharing.

To accomplish this, educators must rethink their most cherished methodologies and assumptions. It is not easy to rethink knowledge in the Net Age.¹⁰ As open-source legal theorist and activist James Boyle notes in “A Closed Mind about an Open World,” we have been conditioned by a confluence of factors, economic and social, political and cultural, to acquire an “openness aversion.”¹¹ The familiar is safe, easy, and reliable. Boyle suggests that aversion to openness—to be disposed against the challenge of the unforeseen—is an actual cognitive bias that leads us to “undervalue the importance, viability and productive power of open systems, open networks and non-proprietary production.” To overcome this bias requires that knowledge producers (those involved in the practices of teaching, in whatever current institutional configuration) rethink every aspect

(from economic theory to citation form) of what is thought of as “knowledge production.”

Digital Presence and Digital Futures

Digital technologies increasingly enable and encourage social networking and interactive, collaborative engagements, including those implicating and impacting learning. Yet, traditional learning institutions, both K–12 and institutions of higher learning, continue to prioritize individualized performance in assessments and reward structures. After a century and a half of institutional shaping, maturing, and hardening, these assessment and reward structures have become fixed in place. They now serve to weigh down and impede new learning possibilities.

Digital technologies have dramatically encouraged self-learning. Web interfaces have made for less hierarchical and more horizontal modes of access. The Web has also facilitated the proliferation of information, from the inane and banal to the esoteric and profound, from the patently false, misleading, even (potentially) dangerous and destructive, to the compelling, important, and (potentially) life-enhancing and life-saving. But the relative horizontality of access to the Web has had another surprising effect: It has flattened out contributions to knowledge making, making them much less the function of a credentialed elite and increasingly collaboratively created.

What are the implications of this dual horizontality—of access and contribution—for learning, then?

First, self-learning has bloomed, from the earliest moments children figure out online possibilities through adulthood. In the digital era, informal learning is often nonhierarchical, more peer-to-peer and peer from (often anonymous) peer. There

is increasing evidence, from numerous studies, that youth learn a range of complex skills—from protocols of interaction to those of etiquette, from negotiation to moral judgment, from time management to powers of concentration and self-discipline, and from strategic reasoning to collaborative facility—as a result of massively multiplayer online games.

Even online reading, according to Alan Liu, has become collaborative, interactive, nonlinear, and relational, engaging multiple voices.¹² We browse, scan, connect in mid-paragraph if not mid-sentence to related material, look up information relevant or related to what we are reading. Sometimes this mode of relational reading might draw us completely away from the original text, hypertextually streaming us into completely new threads and pathways across the information highways and byways. It is apt that the Internet is called the “web,” sometimes resembling a maze, but more often than not serving as a productive, if complex and challenging, switchboard.

Networking Authority, Authoritative Networks

These emerging modes of learning entail a shift in trust. Where sources of knowledge making and authority become less visible, less face-to-face, more anonymous, and less concretely institutionalized, what or whose sources are we to trust as authoritative? And how do we discern the acceptable from the unacceptable, the trustworthy from the misleading or manipulative, the demonstrably compelling from the half-truth or the flatly false?

Second, this puts pressure on how learning institutions—schools, colleges, universities, and their surrounding support apparatuses—enable learning. Institutional education has traditionally been authoritative, top-down, standardized, and predicated on individuated achievement measured on standard tests.

Increasingly today, work regimes involve collaboration with colleagues in teams. Multitasking reinforces capacities to work around problems, work out solutions, and work together to complete projects. Given the range and volume of information available and the ubiquity of access to information sources and resources, learning strategy shifts from a focus on information as such to judgment concerning reliable information, from memorizing information to how to find reliable sources. In short, learning is shifting from learning *that* to learning *how*, from content to process.

Accordingly, learning is shifting from issues of authoritativeness to distinguishing good knowledge sources and substance from those that are questionable. Increasingly, learning is about how to make wise choices—epistemologically and methodologically, concerning productive collaborative partnerships to broach complex challenges and problems. Learning increasingly encompasses how to resolve issues regarding information architecture, interoperability and compatibility, scalability and sustainability, and how to address ethical dilemmas. It concerns issues of judgment in resolving tensions between different points of view in increasingly interdisciplinary environments, what knowledge authorities and claims to trust in complex learning environments.

We are being moved to interdisciplinary and collaborative knowledge creating and learning environments in order to address objects of analysis and research problems that are multidimensional and complex, and the resolution of which cannot be fashioned by any single discipline. Knowledge formation and learning today thus pose more acute challenges of trust. If older, more traditional learning environments were about trusting knowledge authorities or certified experts, that model can no longer address the complexities of relational constitution of

knowledge domains. Today, we find ourselves challenged not just by trusting an individual in a domain but trusting teams, partnerships, when to cede authority to others and when to retain it, not just in determining outcomes but in the posing of the questions. Our sense of trust has shifted from authorities in substantive knowledge to questions of trust in formulating judgment itself.

Collaborative Knowledge Building Online

The Wikipedia experience provides a good illustration of collaborative knowledge creation and the emerging protocols and various challenges for learning surrounding it (figure 3.1). Initiated in 2001, Wikipedia was intended as an online, free, and openly fashioned and created encyclopedia. It would expand through contributions, edits and corrections, rephrasings, and replacements on most any subject of interest to its community of users. Wikipedia was both an early instigator and exemplary icon of the sort of collaborative, social networking production that quickly came to define Web 2.0. Currently the largest general reference source available—on the Web or in print—by the close of 2007, it boasted almost 10 million articles in more than 250 languages. The reference work of choice and often the source first consulted, Wikipedia consistently is in the top 10—and usually in the top five—of all visited Web sites.

Today, Wikipedia is the reference source most broadly consulted by students at all levels when working on an assigned project. Entries are crafted collectively and collaboratively, multi-authored and multiedited, sometimes leading to authorial investment, errors and inconsistencies, trivia, and irrelevance. These latter concerns, along with the ease of access and the irreverence for credentialed knowledge creation and authoriza-

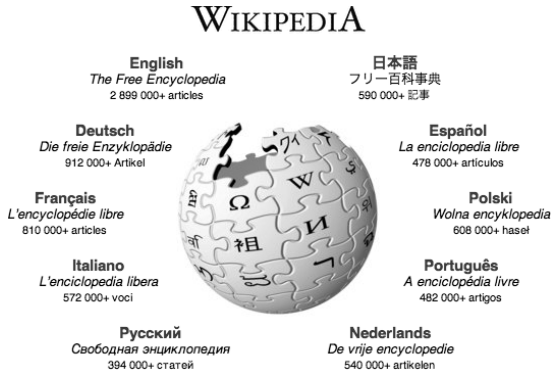


Figure 3.1

Screenshot of the Wikipedia home page (<http://www.wikipedia.org>, accessed July 29, 2009).

tion, have rendered some scholars and teachers skeptical about Wikimania. This skepticism, in turn, has generated analysis. Recent studies have shown Wikipedia to be in general no less reliable—and sometimes considerably more reliable—than the most credentialed traditional encyclopedias such as *Britannica*.¹³ No matter; teachers in secondary and higher education have been moved either to limit or completely restrict use of Wikipedia for course assignments or to issue stringent guidelines for Wikipedia consultation and reference.

Alan Liu has circulated a useful and levelheaded set of guidelines he issues to students in his undergraduate college classes about consulting Wikipedia for formal coursework purposes (figure 3.2). Like any encyclopedia, Wikipedia provides a good entry point to knowledge on a wide range of subjects. But, Liu points out, its entries can be uneven, sometimes misleading, open in the unregulated world of Web 2.0 knowledge creation

to manipulation, contestation, unsettlement, obfuscation, and, indeed, error. It should not, he concludes, be the sole source informing students' work. In addition, given that the central strength of socially networked knowledge formation is its ability to constantly and more or less instantaneously reform itself, Liu recommends that any citation to Wikipedia material include the date of consultation.

The screenshot shows a web page for the Department of English at the University of California, Santa Barbara. The page is titled "Course Materials" by Alan Liu. The main heading is "Student Wikipedia Use Policy" with a link to "about this policy statement". Below this, the section is titled "To the Student: Appropriate Use of Wikipedia". The text explains that Wikipedia is a valuable resource but has limitations. It lists one limitation: "As in the case of any encyclopedia, Wikipedia is not appropriate as the primary or sole reference for anything that is central to an argument, complex, or controversial." It then defines "Central to an argument" as crucial to the paper, "Complex" as requiring analysis, and "Controversial" as requiring listening to original voices in a debate.

Figure 3.2

Screenshot of Alan Liu's Guidelines for Wikipedia use (<http://www.english.ucsb.edu/faculty/ayliu/courses/wikipedia-policy.html>, accessed June 29, 2009).

Liu's guidelines for Wikipedia use apply more generally to Web consultation for learning practices. Web information requires independent corroboration, either from other Web-based sources or from other media deemed at least as reliable. Web 2.0 learning is effective in generating an attitude of healthy epistemological skepticism, motivation to keep an open mind, a disposition to extend knowledge seeking, and the honing of the capacity to refine modes of judgment. On the production side, it is a call to collaborative knowledge making, to constant revision in the wake of new information and expertise, to updates in the wake of new insights and resources, and to seek others out as complements, domain experts, and checks on one's own knowledge and capacities.

Liu, however, goes further. He exhibits not just prudent protocols for developing, circulating, and drawing on Web 2.0 knowledge and learning capacities. His elaborated views demonstrate the limits of importing older modes of recourse to authoritative education deeply at odds with the newer Web 2.0 modalities. Thus, Liu argues that "we" should "police" and "control" entries made to Web 2.0 collaborative knowledge-creating sites (Liu, 2009).¹⁴ By "we," he seems to mean domain experts, those credentialed authorities belonging to a community of experts licensed—by credentialing institutions, authoritative knowledge networks in a field, or standing associations—to determine what is reliable knowledge and what is not.

Liu's reinstatement of traditional knowledge authorities overstates the case for expertise and undervalues new collaborative modalities of knowledge creation.¹⁵ For one, it assumes credentialed experts have a premium on authoritative knowledge and fails to acknowledge that "experts" also are open to error, bias, and the already given, whether individually or collectively. And it belies the productive strength of collaborative Web 2.0

knowledge formation. Liu fails to consider, in addition, that domain experts likewise are leaning increasingly on Web 2.0 strategies and technologies for creating collaboratively produced knowledge in or across their fields of expertise. They are drawn to the collaborative interaction, the ease of accessibility, the speed of interaction, and the dissemination possibilities. Thus, E. O. Wilson, the noted biologist, has been leading a major online undertaking in collaboration to provide a comprehensive, open-source, online catalog of knowledge about every known biological species. It is, as the home page announces, “an ecosystem of websites that makes all key information about all life on Earth accessible to anyone, anywhere in the world” (well, anyone with Web access). The project seeks contributions from the general public but nevertheless has stringent oversight of the quality of contribution, looking to domain experts as content editors.

Liu no doubt is right to call for greater transparency about the production of Web 2.0, to make technologically evident the debates, exchanges, differences, and controversies and the edits, deletions, revisions, and reformulations that occur in fashioning knowledge in online knowledge sites such as Wikipedia. Revealing these background conflicts for anyone to consult is itself a learning tool and also enables the possibility of people deciding for themselves what are the most compelling or insightful interventions, no matter the final or most polished version of the contribution posted to the site. This condition holds as much for domain expert contributions as it does for popularly created sites. Thus we urge the same condition of the comprehensive *Encyclopedia of Life* as we do of Wikipedia (figure 3.3).

Currently, technological interest in interactive digital modalities lies in expanding open access, in ensuring interoperability of systems and their applications, and in enabling as wide and

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EOL Encyclopedia of Life

"Imagine an electronic page for each species of organism on Earth..." - Edward O. Wilson
 login | create an account

SEARCH: **Find**

Showing authoritative information

Names Tags Full-text

Explore

more species **11**

<i>Eudocis elegantulus</i> (L. C. Smith, 1837) Southern Needle-clawed Bushbaby	<i>Chamaecrista fasciculata</i> (Michx.) Greene Showy partridgepea	<i>Mylius aspidus</i> Jordan and Gilbert, 1882 Goatfish	<i>Carthagenus paniculatus</i> (L. F. Gillet.) Herbert Hairy chaffweed	<i>Scariosus compositus</i> var. <i>Xanthus compositus</i> (Poir.) Merr. Composite dropseed	

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Featured

Amanita phalloides (Vaill. ex Fr.) Link, 1833
The Death Cap

What's New?

- 06/01/2009** - The e-Biosphere 2009 conference is now going on in London. Follow the attendees' tweets via RSS or webpage.
- 05/28/2009** - *Chromis abaxus* is amongst the International Institute for Species Exploration's top ten species discoveries of 2008.
- 05/26/2009** - And the winner is...
- 05/22/2009** - International Day of Biodiversity
- 05/19/2009** - Results are in from our second Flickr photo contest!
- [more news...](#)

Figure 3.3

Screenshot of the Encyclopedia of Life (<http://www.eol.org/index>, accessed June 29, 2009).

robust a set of social networking tools as possible, whether for purposes of consumption, recreation, cultural production, revenue generation, research, or knowledge formation. The prevailing interest is in applications that connect one to others, peer to peer, many to many. Considerable interest prevails in development and application of virtual learning environments, in mapping and mash-ups, in simulation and animation, in textual analysis and language exploration tools, in distributed data collection, in archiving, and in analyzing applications. Internet 2, Lambda Rail, high-performance supercomputing, Grid networks, and other technologies allow for almost instantaneous

sharing and manipulation of massive amounts of data. Work is also being devoted, though somewhat more remotely, in Web 3.0 strategies to semantic Web considerations, rendering it possible ultimately for machines to understand what is being written (and perhaps much further out what is being said, drawn, in general represented and expressed in multiple formats).

Learning Futures, Futures of Learning

Given these expansive directions in technological prowess, how might learning opportunities and modalities, applications, and tools be thought about, designed, or put to work in socially networked and mobile learning? If virtues, technological as much as social, are vested in dispositions of adaptability, flexibility, and transformability, in improvisation and in translation capacities, how might these virtues be embedded in learning practices to position learners most effectively to take advantage of these emerging technologies? How is trust to be reinstated in the shifts from knowledge authorities to knowledge sources, from institutional arrangements and authorities to process and collaboration?

First, if education has increasingly become about “learning that”—learning of and for facts, unproblematically presumed—the digital and increasingly mobile movements dispose learners to figuring out process. The latter concerns how to do things and why some ways work and some do not, indeed, more deeply, why things have come to be as they are and how they could be different and improved. So, the first shift in regimes of learning is from fact to question, from the static of “knowing that” to learning to ask the right, most revealing questions. In questioning, a good part of the lesson is not just in figuring out the nature of things but in the realization that *how*

the question is asked—the frame, the tone, the addressee—can be as important as the question posed.

Second, collaborative learning is more often than not more productive than the sort of individualized learning that has become the central force of contemporary educational systems. Collaborative learning is peer-to-peer learning, laterally rather than hierarchically fueled. Digital technology is conducive to collaborative learning by condensing the space and time across which learning can usefully take place. It is all learning, all the time, across distributed distances and location, and through the extended social networks that Web 2.0 technologies have made conceivable and realizable.

Socially networked collaborative learning is predicated on expected practices, at best imposed as a form of discipline by individualized learning. There are a set of virtues, dispositional habits, which are constitutive of expected practices, including taking turns in speaking, posing questions, and listening to and hearing others out. By extension, they also imply correcting others and being open to being corrected oneself and working together to fashion workarounds when straightforward solutions to problems are not forthcoming. It is not that individualized learning can not end up encouraging such habits and practices. But they are not natural to individual learning, which tends to be a social framework that stresses the competitive, winner-takes-all, and domination of the successful rather than cooperation, partnering, and mediation. If individualized learning is chained to a social vision prompted by “prisoner dilemma” rationality, in which one cooperates only if it maximizes narrow self-interest, networked learning is committed to a vision of the social—stressing cooperation, interactivity, mutuality, and social engagement for their own sakes and for the powerful productivity to which it more often

than not leads. The power of 10 working interactively will almost invariably outstrip the power of one looking to beat out the other nine.

Networked learning is central to the fabric of open-source culture.¹⁶ Open-source culture seeks to share openly and freely in the creation of culture, in its production processes, in its product, and its content. It looks to have its processes and its products improved through the contributions of others by being freely available to all. If individualized learning is largely tethered to a social regime of copyright-protected intellectual property and privatized ownership, networked learning is committed to an open-source and open-content social regime. Individualized learning is hierarchical: One learns from the teacher or expert, on the basis of copyright-protected publications bearing the current status of knowledge; networked learning is peer-to-peer and more robustly many-to-many, or *many-to-multitudes*. Many-to-multitudes interactivity fuels digitally-driven social networking, as much in learning as in economic practices. It provides the circuits and nodes, the combustion energy and driving force for engaged and sustained innovative activity, sparking creativity, extending the circulation of ideas and practices, providing the test sites for innovative developments, and providing even the laboratory for the valuable, if sometimes painful, lessons to be learned from failure.

The connectivities and interactivities made possible by digitally enabled social networking in its best outcomes produce learning ensembles in which the members both support and sustain, elicit from, and expand upon each other's learning inputs, contributions, and products. Challenges are not simply individually faced frustrations, Promethean mountains to climb alone, but mutually shared, to be redefined, solved, resolved, or worked around—together.

An application such as Live Mesh allows one to unite and synchronize one's entire range of devices and applications into a seamless web of interactivity. It enables instantaneous file- and data-sharing with other users with whom the user is remotely connected, thus allowing for seamless and more or less instant communication across work and recreational environments. Our technological architecture thus is fast making *net-working*, in contrast with isolated, individualized working, the default. Slower to adapt, the organizational architecture of our educational institutions and pedagogical delivery are just starting to catch on and catch up.

Reading and writing practices in higher education, for example, have been traditionally individualized. We traditionally have marked up papers or books by underlining our own copies and writing in the margins. We might look up a reference, usually in serial and linear form, proceeding from one publication to another. Even reading groups operate by bringing together our individual perspectives into an occasional meeting, the collective experience ultimately feeding our individualized understanding and production, and leading to our own usually discrete outputs (at least outside of the sciences). Merit reviews of work have reinforced these individualizing ritual practices.¹⁷

Contemporary reading and writing practices are transforming before our eyes. Interactive reading and writing now increasingly engage us. One can read together with others remotely, commenting between the virtual lines and in the margins, reading each others' comments instantaneously, composing documents together in real time by adding words or sentences to those just composed by one's collaborators. The lines between one's own words and those of another's—let alone between whole sentences—become quickly blurred. (The authors of *this* text would be hard-pressed to identify exactly which one, in the

end, wrote which word!) Hyperlinking has encouraged reading not just *within* and then *between* discrete texts but much more robustly *across* texts, inter-referencing and interweaving insights and lines of referencing. How texts relate, as a consequence, has become dramatically magnified, making visible what hitherto has been hidden largely from view.

Hyperlinking and inter-referencing have become so robust, so constitutive of online compositional and reading practices, that they have dramatically affected the design of published materials, as much in hard as in virtual copy. The first impact could be seen in magazine publishing. Traditional magazine layout consisted of complete pages of linearly produced written text in continuous and uninterrupted narrative. You got lines of words on the page, interrupted (if at all) by an illustration or photograph. In the wake of Internet influence, this layout has given way to pages cut up into segments, boxes, with multiple sources of information interweaving but also discontinuous and disconnected. The effects on textbook, academic, and trade book monograph production have become more recently palpable. It remains an open question whether this design change will have an equally telling transformative epistemological impact, leading to changes both in how and what we know as well as to the sorts of philosophical changes hinted at the outset of this chapter in *how we know how we know*.¹⁸

Principles and Protocols of Digital Learning

The consequences of these shifts can be summed up in a series of pointers. First, the sort of peer-to-peer redistribution to which we have been drawing attention is predicated, at least in principle, upon *sharing among equals*. There has been a rising call for equality of collaboration and communication with

those who could not possibly share resources because of social disparities and unequal distribution of wealth, access, and technology. Sometimes age (lack of resources among youth, lack of attention to what drives youth now) might constitute a barrier; sometimes class, nation, culture (or culture tied to gender) or other factors might be the barriers. At least some (or some of those in) richer organizations with a fuller array of resources are looking to work, as equals, with those who offer other kinds (and not seldom more compelling forms) of intellectual, cultural, or social capital but who do not have the economic or technological assets to collaborate as equals without some transference of technologies. The fluidity and creativity of technological sharing in order to facilitate shared learning can be breathtaking. *Top-down* and *bottom up* do not begin to capture the subtler dynamics of production, distribution, exchange, circulation, and consumption. Influences run in all directions; influence is never a one-way street.

For example, mobile phones have had far greater impact in poorer societies such as those throughout Africa than laptops have had. For one, they are cheaper to own, more mobile, and more easily shared within (extended) families or across segments of villages. Researchers are just beginning to recognize the possibility of designing learning programs for hand-held devices that are likely to revolutionize learning in such societies. The Mobile and Immersive Learning for Literacy in Emerging Economies (MILLEE) project designs robust story-based games to fit mobile phones in developing countries to facilitate interactive language learning. Partnering with Sesame Street India, for instance, MILLEE has created a mobile-phone game environment for young girls working in rural fields to learn English as a second language.¹⁹ To be effective, design engineers must learn local culture and understand learning motivations, challenges,

cultural practices, and protocols. These practices and protocols, in turn, alter the syntax and semantics of the (cultural) language learned. For these changes witness, for one, the transformations in any credible English dictionary over time.²⁰

Second, this *mixed reality* is knotted with mixed media, with the drive to *mash up* culture and modes of production. So many projects now abundantly flow in and out of the screen, in and out of the streets. Virtuality and digitality are part of the face-to-face world, more so with cell phones and iPods but also with laptops (even ones minimizing costs, whether the admirable undertaking of “One Laptop Per Child” (figure 3.4), committed to widespread and worldwide distribution of \$200 machines, or Intel’s equally ambitious “Classmate” (figure 3.5), its \$400 educational computer “for the developing world”). The hype of digitality cordoned it off from the real world. Projects are meshing, unmeshing, and remeshing virtual and real in all sorts of ways, across time and place, almost seamlessly, sometimes ubiquitously. Mash-up characterizes “the real,” material life as much as the imagined creations. Witness here, too, the transformative impact on the designs of the machines themselves.

Third, the spread of mobile technologies and inexpensive laptops suggest that, increasingly, digital learning is *global* learning. Learning projects more and more have a global vision, global partners, and global reach. It is the World Wide Web, after all, and at no time in history has it been easier to learn in tandem with digital partners half a world away. Digitalities have gone global. The growing globalization of the everyday—politically, economically, culturally, or in terms of our daily living practices—requires that learning must have global scope, too. Learning’s global scope (or maybe the plural *learnings*, to stress the multiplicity of dispositions, practices, impacts, and implications) has transformative effects on Internet culture,



Figure 3.4

One Laptop Per Child (OLPC) is an association founded by the MIT Media Lab to develop a low-cost, low-power agile and rugged computer with applications to provide every child in the poorest countries with appealing and appropriate learning possibilities. “OLPC espouses five core principles: (1) child ownership; (2) low ages; (3) saturation; (4) connection; and (5) free and open source” (<http://laptop.org>, accessed June 29, 2009).

too, ranging from aesthetic to translation programs, from game design and social networking protocols to Internet protocol considerations.

Fourth, the “bowling alone” pronouncements about the lonely life of the Internet-obsessed youth are over, initially undone by massively multiplayer online games and the popularity of social networking sites. These digital learning projects show that learning together has a much broader reach than might have been expected. In all ways—imaginative, social, communicative,



Figure: 3.5

Intel's Classmate PC, a small, economical and mobile educational solution that Intel has developed specifically for students all over the globe (http://www.intel.com/pressroom/kits/events/idffall_2008/photos.htm, accessed June 29, 2009).

and educational—people, young and not-so-young, are learning how to be digital *together* and *digitally* together. Sociality is online, offline, and all points in between. Go into any coffee house in America, as elsewhere, and there are people deeply embedded in their laptops one moment, as they might be in a book, and laughing with one another the next. They are also working together over a shared interface, whether a common computer or communicating at a distance, even if that distance is simply the table between them. And, in any case, where youth look like they might be on their own, their instantaneous connectivity and multitasking facility—through mobile devices

and text messaging—quickly belie the appearance. This is an incredibly social time, if these projects are any indication. The digital sociality of youth does not look like past forms of social interaction, but that is what being young is about!

And finally, it has become obvious that, from the point of view of learning, there is no finality. *Learning is lifelong*. It is lifelong not simply in the Socratic sense of it taking that long to realize that the more one knows, the more one realizes how little one knows. It is lifelong in the sense also, perhaps anti-Platonically, that the increasingly rapid changes in the world's makeup mean that we must necessarily learn anew, acquiring new knowledge to face the challenges of novel conditions as we bear with us the lessons of adaptability, of applying anew lessons known to unprecedented situations and challenges. It is not just that economic prospects demand it; increasingly sociality and culture now do, too.

Examples abound of the complex interplay of these conditions of possibility in the newly emergent culture of learning. Some, like Doug Thomas, have cited the unpredictably robust learning possibilities from massively multiplayer online games, such as *World of Warcraft*, from economic transactions and strategic thinking to principles of collective behavior and moral decision-making. There are abstract learning possibilities at play in such a game, but it also reinforces the thrill of war-mongering and war-making, of resolving issues through prevalent force and the recourse to violence to get one's way. There are other gaming opportunities to prompt the affirming lessons without warring belligerence that deserve much greater pedagogical and market focus.

Examples include many “performative play” games profiled by Persuasive Games²¹ and AgoraXChange, the political game

about nationalism, inequality, and state-making.²² There are extraordinary possibilities afforded by learning creatively—precisely through a *game* such as *GameStar Mechanic* (figure 3.6) or of the innovative reskinning of war-game engines, as in *Virtual Peace*, to promote hands-on learning about mediation and conflict resolution.²³ This affords players the opportunity to learn how to design games, most notably through modding existing (even commercial) platforms. These learning possibilities range from aesthetic and design practice, narrative construction, interactive storytelling, and storyboarding to systems analysis, the logics and rules of games, programming and computing skills, and intellectual property challenges. They extend



Figure 3.6

Screenshot of the home page for Gamestar Mechanic (<http://www.gamestarmechanic.com>, accessed June 29, 2009).

also across social and economic skills in working with others, being held to timelines, thinking about budgets, as well as the negotiation of multimedia.

Other exciting possibilities include the environmental studies game, *Black Cloud*,²⁴ drawing together into an interactive mix of high school students in Los Angeles and Cairo, Egypt. Using pollution sensors placed by the gamers in each city, teams divide into role-playing either real estate developers or environmentalists to determine compelling sites for additional development or conservation. Lessons here include the science of pollution production and testing, the politics of property development, and cross-cultural global communication. Microsoft's *Worldwide Telescope* (figure 3.7) offers visualization software that enables one's personal computer to become a high-powered telescope to explore the astronomical universe. It offers extraordinary possibilities to people of all ages, guided by scientific experts or on their own, to immerse themselves in astronomical knowledge, from the most basic to the most complex. Above all, because it is fun and enticing to engage, it can serve as a primary exploration tool for people at almost any level of expertise or a compelling supplement to classroom instruction at almost any level.

Taken together, the viral pull of many-to-multitude learning, the lure and challenges of sharing among equals, the attractions and necessary negotiations of globally interactive learning, the enormous benefits and challenges of robustly networked knowledge formation and acquisition, and the transformative realities of lifelong learning represent the range and varieties of digitally-driven modes of learning.

The larger questions remain pressing, even universal: What to believe and on what grounds?, On what rests the credibility of sources, on what basis are claims to be trusted, and what are



Figure 3.7

Screenshot of the interface for WorldWide Telescope (<http://www.worldwidetelescope.org>, accessed June 29, 2009).

the most and least compelling uses of available knowledge? The most convincing responses to these questions may themselves be transforming, if less wholly or quickly, alongside the rampant transformation in mode and media of knowledge formation, circulation, acquisition, and authorization.

Challenges from Past Practice, Moving Fast Forward

This book stresses the range of opportunities and the transformative possibilities for learning at all levels as a result of readily available and emergent digital technologies and acknowledges

the challenges, limitations, and misdirections—in short, the opportunity costs—resulting from these developments. Some of these costs are inevitable when unsettling long-established ways of doing things. When well-established modes of knowledge making and acquisition stagnate, they can become restrictive, if not unproductive. As new modes emerge, the old institutional structures can either dig in and refuse to respond other than to dismiss the new modes, or they can seek to work out renewed and renewing regimes to take advantage of possible productive elements.

The challenges by digital learning to institutional order in higher education (though these challenges count, too, in thinking about other institutional levels) range from the banal to the constitutive, from the disciplining of behavioral breaches of protocol and expectation to normative conceptions of what constitutes knowledge and how it is authorized.

A common complaint among educators today, most notably classroom instructors, concerns the divided attention during class time as a result of mobile device access and multitasking in the classroom. If students can “backchannel” or “google jockey” (or google jockey *and* backchannel) during a lecture, it not only can distract but can potentially undermine the authority of the instructor as views are questioned by access to alternative sources and circulated dissent. This may not be a bad thing—undercutting claims to authority in favor of truth claims. But students with Wi-Fi mobile access through laptops, personal digital assistants (PDAs), and cell phones are increasingly attention challenged as a result of multitasking and may be lured via connectivity to worlds away from boring lectures. Reports have students in lectures ordering consumer goods (one of the juicier reports involved purchase of a wig), playing online games, text messaging with friends, breaking up with

boyfriends or girlfriends, making dates, or reading online newspapers (not so different from an earlier moment of the rustling newspaper at the back of the class).

Colleagues have called for a complete or partial ban of laptops and other mobile apparatuses from the classroom, with some reporting a dramatic increase in quality of classroom participation as a consequence.²⁵ This is one response, but it fails to address all the underlying factors pushing students to look elsewhere for sources of engagement. It addresses the symptom rather than the cause. Another response might be to seek, in novel and challenging ways, to incorporate creative technologies into the classroom. The google jockey can rotate through the class roster; rotating laptop note-takers can be restricted to, say, two per session, who then must share their notes with other students in the class; all laptops can be hooked up to data projectors so that what is on a screen can be projected for all to see without notice; and so on. The point is that one could be restrictive or productive, curtailing or creative. No policy-driven one-size-fits-all solution is called for or will succeed.

Second, there is a proliferating array of creative invocations of technology to support learning activities. Students most often are broken up into collaborative groups to work together to produce conjoint course products related to the material discussed in class. The outcomes can be terrifically productive, promoting all sorts of skill development from online research skills to collaborative sharing capacities to technological facility. But as often as not they can also produce a disposition to romance the technological for its own sake, an aestheticism and formalism that at best ignores the development of knowledge content and at worst leaves completely unchallenged deep errors about a subject matter for which, as much as anybody, the instructor is ultimately responsible.

Third, the more or less openness and easy anonymity of Internet culture enable, if not license, the proliferated circulation of untruths and half-truths. This has been especially pernicious in political and commercial venues, where smears, innuendo, rumor, and misrepresentation have the potential to do enormous damage quickly. The less educated, lesser informed, judgment challenged, and insular nativists are prone to manipulation and exploitation. But the compelling response here is not to insist on authoritarian modes of learning, on top-down assertion by some small class of experts; rather, it is to shift focus from authority claims to assessment of authority claims and the stature of authority itself. The point is not to abandon or restrict contemporary technology—what could that possibly mean, in any case?—but to put it to good use, to acquire the tools for wise judgment about what it does, what it delivers, how and whom it benefits and harms, and what sort of sociality and polity it can and does enable.

There is the challenge of how to assess and accredit learning under these morphing models. In a posted response to a *Future of the Book* draft, C. Avery suggests that there are two assessment models at play: what has become institutionally dominant as “satisfy the gatekeeper” outcomes in which candidates must satisfy institutional review to be certified and open-ended discovery driven by individual interests and the development of tools instrumental to satisfying those interests. If the former is assessment driven, the latter is outcome oriented.²⁶

We have been suggesting another form. This concerns productive learning by creating together and learning from that coproduction—about process, about content, about modes of production, about sociality, about ethics, about leadership, about temporal discipline, about multitasking, about distributed tasking, and so on. Call this “collaborative-interactive.”

Issues of collaboration are crucial to the future of learning institutions. But so, too, are originality, reward, accountability, and sustainability (including public and private sponsorship and support).

The modes of institutional assessment that are just starting to be elaborated here would be particular to the elements of learning involved, and require the sort of creativity equal to that of the elements involved. Some of the traditional criteria of assessment would be incorporated regarding knowledge content in a field, for instance. Some criteria would need to be newly forged regarding the facility to multitask productively, to google jockey and not lose the broader thread of argument in a talk or class period, or to identify and successfully pursue novel funding sources for not easily fundable projects (a facility widely ignored in traditional undergraduate and graduate education).

Mark Bauerlein has chastised the age group under 30 today as “the dumbest generation.” He skewers all members of the technological generation—of “digital natives”—as incapable of book reading, as lacking the capacity to spell, of being narrowly self-concerned with looks and fashion and the latest craze, as incapable of thinking and writing, as consumed with facile games and incapable of remembering, and of being unconcerned with the broader world around them.²⁷ Though there no doubt are young people who fit this stereotype, this far from exhausts an extraordinary array of young people who are more technically facile than previous generations ever were (or are), that speak multiple languages fluently, that are at ease across and in multiple worlds, that are deeply engaged in collaborative projects of various creative kinds, and, if the Obama presidential campaign is anything to go by, that are deeply involved not just in traditional political activities but care deeply about their

own and other worlds. If there is cause for critique here, it is to be directed at key elements of the reductive, rote-based education system that has come to mark much of mass institutional education in the United States. No wonder students look elsewhere for their engagement. What narrow-minded and self-possessed world, we wonder, does Professor Bauerlein inhabit?

Futures of Our Pasts

We have been reexamining some of the key premises and the role they have played in shaping learning institutions in general and higher education more particularly, especially since the end of World War II. Access to education at all levels for larger and larger segments of the population was crucial to settling class conflict and the development of middle class aspiration in the wake of the Great Depression. Publicly funded schools, community colleges, technical training institutions, and universities drew rapidly expanding numbers, shaping what it meant to be an educated citizen, a productive employee, and a moral person. As a consequence, income and wealth expanded from the 1930s to the 1980s, though significantly more so for some groups than for others. Demand for labor outstripped its supply, creating an upward spiral for wages and subsequent wealth and quality of life, in particular from one generation to the next.

All this began to change at the onset of the 1980s. The neo-liberal cuts in state services, including notably to educational resources at all levels, driven in the past three decades by the marriage of political economy and the culture wars, has meant a resurgence in inequality tied to educational access, the insistence on test-driven pedagogy, and class bifurcation, racially molded, in access to creative learning practices. The earlier

emphasis on public education has given way to its privatizing erosion at all levels, whether through charter schools and vouchers, through distance-learning programs for the racial poor on reservations, the dramatic privatization of higher education, or through the introduction of user fees for libraries and museums and their transformation by the cultural industry model of urban branding into sites for tourist attraction.²⁸

No institution of higher education in the country today has tested in a comprehensive way new methods of learning based on peer-to-peer distributed systems of collaborative work characteristic of the Internet age. At the school level, social psychologists such as Joshua Aronson and Claude M. Steele have established conclusively that collaborative learning is beneficial across class, culture, race, and religion. These new modes of distributed collaborative engagement are likely both to attract a broad range of motivated learning across conventional social divisions (think of the anonymous interactions across classes and races in online gaming) and to inspire new forms of knowledge and product creation. But can we really say, in 2008, that the *institutions* of learning—from preschool to the PhD programs—are suited to the new forms of learning made available by digital technologies? Is there an educational enterprise anywhere in the world redesigned with the deep assumptions of networked thinking core and central to its lesson planning? Has anyone yet put into institutional practice at the level of higher education what John Seely Brown is calling a “social life of learning for the ‘Net age’ ”?²⁹

If we face a future where every person has (easy access to) a laptop or networked mobile device, what will it mean? What will it mean for institutionally advocated, mediated, and activated learning? How will educators use these tools and this moment? How *can* we use them to inspire our most traditional

institutions of learning to change? The next chapter focuses on what learning institutions currently offer and the obstacles they pose to innovative learning that takes advantage of the online learning practices and possibilities available. By assessing some of the institutional barriers and some of the institutional promise, institutions can be mobilized to change, with formal, higher education as part of a continuum with (rather than a resistance to) the collaborative, participatory, networked interactions that our students engage online today.

