A Pedagogy for Original Synners

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Abstract:
What will the class of 2020 expect when we (the teachers) meet them for the first time? What should we expect of them? This chapter uses the science fictional device of a time-traveling machine to frame these questions. The aim is to provide a context for examining currently under-recognized styles of learning emerging from contemporary game and remix cultures. We will examine a range of educational practices and suggest three key elements that support learning as a process of critical and creative synthesis: 1) open source scholarship, 2) social networking and 3) youth as cultural mediators.

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How can we gain perspective on the contemporary scene of digital learning? In the global era commonly known as the early 21st century, this cultural landscape is far from flat. It is marked by spikes of intense technological engagement and valleys of cultural impoverishment and illiteracy. Accounts of technological innovations dominate the headlines, while the stories of the illiterate and the technologically disenfranchised are relegated to back pages. This is the doubled reality of the dynamic educational scene of contemporary global culture: it has been transformed and is continually being transformed by the wide-scale use of new digital technologies, at the same time it is a place where time-worn inequities stubbornly persist despite the concerted efforts of educational reformers. We agree with cyberpunk science fiction author William Gibson, when he writes: "the future is already here, it's just distributed unevenly."

In an effort to create a vantage point from which to gain a perspective on this dynamically shifting scene, we begin with a speculative scenario of a future-that-does-not-yet-exist assembled from science fictional narrative fragments of the present. We deploy this speculative narrative as a critical technique that enables us to probe the changes in a generation's disposition.[1] For the purposes of this essay, we call the members of this generation "students." We identify ourselves as the "teachers." There are many questions to consider in tracing the contours of the dispositional change of this generation born in a digital age, any of which could serve as the organizing topic for a robust investigation and analysis. For example: How do students of this generation assess information that comes to them in different media forms (in print, text, images, animation, simulation, personal experience, augmented experience, virtual experience, displaced experience)? How do they learn to form new ideas and new insights, both on their own, and as part of collaborative groups? What is the tenor of their informal social learning networks? How do they interact with formal institutions that reify the values of the parent culture? How should these institutions change to address this generational disposition? How will these students be taught to be the stewards of culture for the future? How do we teach them the importance of history, of remembering? How do we prepare them and ourselves for the changes that will inevitably come next?

These questions offer a hint at what might be considered the "unintended consequences" of the deployment of digital technologies for the purposes of education and learning. In investigating the nature of digital learning—the topic of this MacArthur series—the danger lies in assuming either an overly critical or overly celebratory stance regarding the educational potential of digital technologies. Discussions about the relationship between technology and education have a long history. These discussions often devolve into well-worn debates: technology is either the source of salvation or of damnation. The reality is of course, much more convoluted. We know that all technologies reconfigure culture, just as culture serves as the enabling condition for the creation of new technologies. The production of unintended consequences is inevitable; accommodating them is not. Anticipating them is an act of conscious engagement; designing against them is an ethical investment in the future.

The aims of this chapter are both more modest and more ambitious: we begin in the future and end with a manifesto for the present. Rather than rehearse the familiar structure of discussions about the essential nature of technological innovations in

education, we begin with a set of fictional observations about the classroom of the future based on trends already emerging in 2007. This is an exercise in the narrative re-construction of reality for the purposes of creating a cognitive map that not only helps us make sense of the shifting landscape of the present but also guides our travels in the future. This speculative and *ironic* fictional scenario allows us to elaborate key elements of the generational disposition of those who inhabit this landscape as their native milieu. The pragmatic objective of this exercise is to draw out the implications of this sensibility for the purposes of developing appropriate and inspiring educational practices that take advantage of new technological innovations but remains steadfastly attendant to the opportunities to reconfigure the educational/learning/schooling landscape in empowering ways. In the process of formulating suggestions for new pedagogical practices come the opportunity and indeed the responsibility to seriously reexamine current institutional structures for learning.

2020 Vision[2]

> It's 2016, and I'm meeting the first group of students from the class of 2020. I log on and see them for the first time—40 of them floating in front of me in null-zero gravity. I quickly scan the space and I'm pleasantly surprised to see the first (as far as I know) Human-Onkali mutant. I heard that the kids refer to them as "HuMonk-a-Li." Not surprisingly, I also see a retro Lara Croft, a couple of Akiras, the predictable slew of Ender Wiggens and a smattering of glyphs I don't yet recognize.
>
> My IM-patch starts to heat up; one of them has already hacked my earring. I take a deep breath and think, "Let the Games Begin!"
>
> The challenge of course is to get them to play the game that I want them to play, rather than the one they want to impose on me. Here's how their game works: They trick me into wearing a '80s style head bobber with a sign that says: "Stump the teacher." Their head bobbers say things like: "Why should I care?" "Make me" and "Who R U?"
>
> I turn on my left side to get their attention. They're going to do the game grid assessment exercise, the by-now best practice for evaluating gamers' learning potential. I give them the instructions: Enter your persona data – name, race, species, gender, special skills, goals and connections/friends.
>
> Then I tell them: Pick your Medium: Physical, Mental, Chance, or Arts. According to our assessment protocol, students are always limited to the same choices: those on the vertical axis of the game matrix.

The Assessment Grid

(Balsamo, 2008)

	[A] **Naked**	[B] **Tool**	[C] **Machine**	[D] **Animal**
[1] **Physical**				
[2] **Mental**				
[3] **Chance**				
[4] **Arts**				

Assessment Grid id#: 01102016.balsamo.mda140

Simultaneously my evaluation bots randomly select from the characteristics along the horizontal axis: a) naked, b) tool, c) machine, d) animal. These identify the modes of assistance that determine the game play. *Naked* means without anything, just what you walk in with; *tool-assisted* means simple tools such as markers, dice, picks, hammers and pens. *Machine* means the full range of digital devices and applications, as well as engines, robots, biolution devices, flickercladding and other nano manufacturing gadgets. *Animal* includes assistance from typical companion species such as dogs, horses, and dolphins, but also bush robots, gmos, tracer-birds and micro-mice.

The combination of the student selection and the bot selection determines the game they will play from the matrix of possibilities that are generated randomly each time the game grid is activated. I remind the students that the assessment game gives them a chance to test themselves against my evaluation bots that have been programmed to perform my minimal expectations for the achievement of a "B" in the course. If they can't beat my bots, then they should rethink the settings on their persona profiles. I suggest, for example, that they may want to increase their "IQ Point" setting that establishes the average amount of brainspace (and time) they want to allot to learning course material. I remind them that a simple recalibration of their "Attention Intensity" setting can do wonders for their grades. But it remains their decision about how they will calibrate their persona for their performance in the game known as this class.

I also remind them that after each game round concludes, they will have the opportunity to reset their profile preferences for the next set of inter-activities. We limit their profile changes to in-between inter-activities, because we learned early on that students could outsmart game bots by changing their profiles on the fly. The bots are programmed to "learn"—which means that they can't change profile characteristics unless they have acquired experience through repeated encounters with course materials and exercises. Pedagogically we believe that it is important for students to be constrained by the same rule. Thus students have to play their profile preferences through the duration of a single inter-activity. This guards against the temptation to acquire extra-factual memories. Students are actually encouraged to *reflect* on their inter-activity performance in-between sessions, and to change their profiles and calibrations. We call this part of the *learning-process*.

As I watch them play their games, I wonder which ones have signed up to participate in the make-space practicum. I know that only the wealthiest students can afford to enroll in the reality-based course work where we will meet face-to-face and work side-by-side on hand-made projects: paper writing, multimedia presentations, geo-caching exercises and digital prototyping. Their socio-economic class status will become evident at some point, no doubt, so that by the time they show up in LA, I'll know where they are coming from geographically, economically and cosmically. This course is the first to enroll ship-schooled students, the children of the first colonists en route to UBIK4. These students won't be in LA in the flesh, obviously, but will send tele-controlled ditto blanks that they've imprinted themselves onto. Only the really wealthy and the military can afford them: the colonists are neither; it was one of the perks used as an enlistment incentive. I take a moment to contemplate the educational scene unfolding across diverse planes of reality to ask myself: what role can and should I play in their educational process?

Remarks on the Disposition of the *Born Digital* Generation

Born and raised in a digital, networked age, these students-of-a-future—who are already showing up in U.S. university classrooms—are as much shaped by the dominant cultural logic of the early 21st century as they reproduce it through their creative practices and social interactions: they are members of the *born digital* generation. Their beliefs and assumptions about the way "learning" occurs have been shaped by their early encounters with pervasive digital worlds and network technologies, and the ubiquity of "smart" and responsive environments. They present themselves as just-in-time learners, confident that when they need to know something, they'll know where to find it. By the time they are ready to enter the university, these students have amassed significant experience in mining their networks (both digital and social) for their information needs. They treat their affiliation networks as informal Delphi groups.[3] As the statistical phenomenon of Delphi groups demonstrates, even when a "factual" piece of information is not known to each and every person, the aggregate mapping of responses from group members tends to cluster around the correct answer. For these students, the process of "thinking" now routinely (and in some cases, exclusively) relies on social network navigation. Data = information = knowledge is their taken-for-granted epistemology. And for many of them, every world is a game, and all the people merely players. Their imaginations are structured and shaped through encounters in different kinds of mediated worlds: RL and online games, institutional and familial, peer-based and anonymous. They move easily through different kinds of networks:

social, technological, material, and virtual. Consequently, their identities are a hybrid of multiple personae performed and shaped through their participation in dispersed (mixed reality) social networks as well as within simulated virtual (gaming) worlds. In this they are the quintessential decentered postmodern subjects marked by differing intensity flows and shifting affinities. Remix is their cultural vernacular.

Retooling our sense of students not as younger versions of ourselves, but as members of a generation with its own unique disposition provides a starting point for the creation of pedagogical protocols that acknowledge and embrace their essential mutability. At base this requires the reexamination of the notion of *education*—as the term for the institutionalized process of knowledge creation—and the role of professional teachers and academics in the cultural practices (and institutions) of knowledge production. For good reason, we abandoned the notion of education as the dutiful replication of received knowledge claims (at least at the university level, perhaps not so at the K-12 levels in the U.S.) in favor of an emphasis on learning. But we need to push even further in augmenting our understanding of learning as a complex process of human identity formation that is shaped by cultural, cognitive, biological, and social forces. One step is to refine our understanding of "critical thinking" to focus more specifically on the skills of creative and critical *synthesis*. To assist us in these efforts, we might think of these students as "Original Synners," a title borrowed from science fiction author Pat Cadigan's cosmology, which identifies them as "original synthesizers" whose most important literacy will be the ability to create knowledge by harvesting information from diverse sources.

At a basic level, Original Synners must develop strong abilities to critically evaluate the veracity and reliability of information sources. Then they need to learn how to integrate information that comes from different sources, critical frameworks, and academic disciplines. They will need to understand the structural function of "disciplinarity" as an institutionalized practice of knowledge verification. In this, the *born digital* generation has a daunting learning agenda: they must acquire appreciation for the depths of disciplinary knowledge, but not get mired in the merely academic, so that they can forge connections across disciplinary divides in the service of creating new understandings and formulating new questions to pursue. While they might understand intuitively that innovation is a multidisciplinary creative endeavor, they also need to understand how knowledge is produced in the *dialogue* among disciplines, through the process of social negotiation, and in creative collaboration with peers and experts. In short, they must learn how to engage in conversations with those who do not hold the same cultural values or intellectual commitments.

But equally importantly, this notion also suggests other considerations that they do not yet have the perspective to fully appreciate and embrace. For example, although they are already global citizens by virtue of their consumption habits and residence in particular nation-states, they need to understand how the global flows of information and capital affect people in other geographic and cultural contexts. They need to become deeply multilingual, not only in the use of languages but also in their understanding of different cultural logics and global politics. Learning is a practice; knowledge is content. They will have to learn the value of both. In short, Original Synners require new literacies: cultural, technological, social, and epistemological. As professional educators, we have the responsibility to design learning environments and institutional practices that foster the acquisition of foundational skills that students will need for a lifetime of network navigation, information synthesis, social participation, and creative knowledge production.

Educational Institutions in Transition

As we suggest in the opening account of an imaginary meeting with the first group of students from the class of 2020, the classroom will serve as another stage for the performance of their generational disposition. When this happens, the teachers will have as much to learn as the students. These students do not consider their teachers the sole experts in knowledge certification and production, nor do they see the academy as the primary site for the production of knowledge claims. For members of the *born digital* generation, the process of knowledge creation happens across diverse settings, in formal institutions as well as through informal social and technological practices. For them, teaching and learning already occur in different kinds of informational spaces—distributed communities linked by wireless networks and mobile devices as well as on remote campuses, in "smart" classrooms, and in the virtual spaces of on-line environments. The multiplication of learning spaces is enabled in part by increased access to high-speed data networks, but perhaps more important is the increasing familiarity and ubiquity of collaborative online activities as a part of many people's daily lives. Tools such as blogs, wikis, social bookmarking, file-sharing, and tagging are information management applications that once were the domain of computer scientists and professional information architects but are now in common usage among those with regular access to computers and broadband networks.

As educators reevaluate their role in the emergent knowledge economy, other issues must be addressed as well: the role of universities in the knowledge production industry, the waning cultural authority of the professoriate, the notion of education versus credentialing, and the professionalization of junior faculty and graduate students. For just as the development of new digital technologies and networking applications serve as the stage for reconfiguring learning practices of students, so too do these technological innovations provide an opportunity to reengineer common practices within institutions of higher education. For example, for the past decade many universities have invested significant resources in the development of "distance learning" courses in an attempt to produce new channels for tuition revenue. These courses rely extensively on digital networks and course management software in the service of producing new "markets" for a university's product. There is an opportunity to productively re-imagine these efforts as protocols of "technologically enhanced learning" that may enable the university to serve its core constituents better as well.

The idea of using emerging digital technologies for the purposes of educational innovation has been embraced by many faculty. This is simultaneously an exciting and a sobering turn of events: exciting because the experimentation requires teachers to consciously reflect on the nature of learning in a digital age, sobering because the types of learning to emerge from such innovations may not be entirely predictable, and in some cases, perhaps not even desirable. For example: the extent to which computer and video games have captured young people's attention makes games seem like a particularly promising learning platform. Game worlds not only provide dynamic visual, auditory and sometimes bodily stimulation, they also offer opportunities for players to express emotion, to engage in structured play, to gain a sense of accomplishment and social belonging. For many students, (although not all) the bounded nature of a game world holds their attention in a way that traditional classroom educational activities may not. They are simultaneously capable of highly focused attention when they participate in a gaming world, and

incapable (or perhaps unwilling) to pay attention to single-channel communication in the body-based world. Many games require participants to move between multiple planes of reality: the world of the game, of the strategy, of the goal, of other players, and of the real world. These types of games teach and condition a sensibility of rapid partial attending. Gamers learn by cycling through information spaces; they learn to iteratively scan multiple spaces and to adjust their activities in line with new information. In the process, the performance and temporality of "attending" is transformed. This type of "attending" is not easily accommodated by traditional classroom practices. And it remains the case that among university-age students across the U.S., and indeed throughout the world, familiarity and access to gaming platforms and gaming literacy remain stubbornly uneven, with disparities that articulate along predictable axes of racial, economic, and geographic differences. As promising as it may appear, adopting online gaming as the primary digital learning paradigm may not serve all our students equally well.

In order to think concretely about the kind of institutional practices that will augment the literacies of Original Synners, we offer the following discussion of a sample of contemporary innovations that share a particular philosophical stance about role of technology in digital learning. None of these efforts advocate the development of expensive new technologies per se; rather they each use existing applications, information networks and emergent social practices as the basis for the creation of new pedagogical models. They approach these technological practices and resources by asking what they already do best, in order to develop innovative and responsive pedagogical practices. These efforts illustrate three characteristics required for the creation of new pedagogies and institutional structures that appropriately address the learning needs of the *born digital* generation.

1. ***Open***: extensible, participatory, non-proprietary, collaborative, distributed, many-to-many, multi-institutional, global
2. ***Hybrid***: combining networked and physical spaces, blurring lines between academic and everyday social, creative and expressive practices; crossing traditional generational and cultural boundaries
3. ***Media rich***: making sophisticated use of audio, video and interactivity, multi-sensorial, expressive, affective

The profiles that follow highlight exemplary projects, programs, classes and institutions that work with some or all of these characteristics in interesting ways. None of them propose a transcendental model of digital learning; their innovations are context specific, mutable, and recombinant. This is as it should be: for in a digital age, it is unimaginable to think that any single model of learning is going to provide the program of action to address the literacy needs of all members of the *born digital* generation. Our pedagogical task is a remix project in its own right: where we strategically select and combine elements from a range of theoretically grounded innovations for the purposes of developing a robust pedagogy for Original Synners.

Open: Open CourseWare at MIT

The Open CourseWare (OCW) consortium originated at MIT in the late 1990s as an effort to explore the potentials of distance education. Rather than pursue a revenue-driven model of one-to-many online teaching, MIT's Open CourseWare initiative sought to take seriously the institution's mandate to "advance knowledge and educate students in science, technology and other areas of scholarship that will best serve the nation and the world in the 21st century" and so devised a *many-to-many*

educational model that effectively expands the horizons of MIT's curriculum. Faculty participation remains voluntary, but the long-term goal of the initiative is to make available the complete MIT curriculum of over 1800 classes. The OCW administration assists with publishing course materials online and dealing with copyright clearances for course readings and materials; this institutional support is a crucial part of the success of this initiative. If individual faculty were left to navigate the Byzantine structures of information ownership and reproduction rights, few would have the time or resources to participate.

To encourage the collaboration of other institutions around the world, the OCW sets a deliberately low threshold for participation. An institution wishing to participate in the OCW consortium must agree to publish a minimum of ten courses under its own University's name.[4] The consortium provides resources and experience on how to make these course materials available and emphasizes the use of open source tools and software to support these efforts. OCW seeks to create a vast archive of freely accessible course content, including syllabi and a portfolio of readings and supplemental materials. At the very moment when many universities are focusing on branding and tightening controls over intellectual property, the MIT's OCW blueprint defies conventional wisdom in important ways. The key to this program's success lies not in chasing tuition revenue streams outside the university, but in creating learning paths that extend beyond the campus itself. A principle benefit of this program has been to enhance the institution's reputation for progressive thinking among a broad community of education professionals.

MIT is not the only institution to initiate a open source approach to the sharing of educational materials; a number of similar efforts have appeared in recent years, including Carnegie Mellon University's Open Learning Initiative,[5] Rice University's Connexions project[6] and the Open University's OpenLearn project,[7] all of which share ideals of openness and ease of access. What is remarkable about these organizations and initiatives is the speed with which they have appeared and taken hold across a broad spectrum of university contexts. During the first seven years of its existence, the MIT initiative published more than 1,400 graduate and undergraduate classes from the MIT curriculum. Perhaps more importantly, the reach of the OCW is worldwide, with exceptionally active participation by institutions in France, Japan and China. The many-to-many aspect of this rapidly expanding global network is of particular importance here. Rather than simply exporting cultural capital from American universities to the rest of the world, the OCW model encourages multi-directional exchange and cross pollination of ideas, resources and pedagogies.

One factor that contributed to the rapid rate of adoption of the Open CourseWare model is the broad success (in both commercial and non-commercial realms) of "open source" software" development over the past two decades.[8] Although few forms of creative production lend themselves as readily to open source production as software programming, a number of similar undertakings have emerged from within other spheres of artistic, scholarly, and technical endeavor. These range from the *open source cinema* movements centered in the UK and the Netherlands to various open content organizations in the San Francisco bay area, such as Creative Commons,[9] the Internet Archive,[10] Electronic Frontier Foundation,[11] Open Source Initiative,[12] and Prelinger Library,[13] all of which take as their point of departure the value of peer-to-peer information sharing and the support of participatory culture.

Given the rising costs of tuition at both public and private universities and the

resulting divisions of access along economic lines, it is likely that informal peer-to-peer networks and "viral education" will continue to increase in popularity.[14] To this end, a number of research efforts and organizations are examining these emerging forms of learning. Groups and research efforts including the Open Educational Resources Commons,[15] the Monterey Institute for Technology and Education (MITE), the New Media Consortium (NMC) and the Institute for the Studies of Knowledge Management in Education (ISKME) have all begun to explore the potentials of extra-institutional learning. An evolving role for educators in this type of distributed, multiple, shared learning landscape is to orchestrate the conditions of possibility within which individuals may participate most productively and to develop methodologies that fluidly cross traditional institutional boundaries. In this sense, teachers begin to resemble *educational designers*, whose expertise may include deep disciplinary knowledge, but whose practice involves mobilizing the efforts of communities and individuals in relation to institutional resources.

The proliferation of APIs (Application Programming Interfaces) accessible to ordinary Web users, has led to a similar reconfiguration of many users' approach to networked media. No longer considered mere consumers and navigators of networked content created by others, web users are now designing their own tools, performing *mashups* of materials that are available through existing databases and online archives, creating multiple user-interfaces that transform the nature of information access.[16] Perhaps more importantly, the nature of information that is made available in networks is itself being transformed. Data may no longer be simply understood as static nodes of information to be accessed with speed and efficiency. Databases are dynamic, reconfigurable systems. In interacting with these systems, users become *producers* as well as consumers of structured information systems. Other practices such as DIY and "prosumer" cultural productions such as file-sharing, writing-in-public and social bookmarking are also being investigated as possible new learning protocols for use not only by amateurs (those without the formal credentials to produce knowledge claims) but by professional educators who recognize the power of these easily accessed information sharing tools.

Two recent books, Henry Jenkins' *Convergence Culture* and Yochai Benkler's *The Wealth of Networks*, have discussed the potential social and economic benefits of participatory networks in the culture at large. Educators are poised to deploy the use of peer-to-peer information sharing as strategies for teaching and learning. For example: Linda Stone argues that the new disposition of "attending" common among gamers—a disposition she refers to as "continuous partial attention"—can be an extremely powerful mode of engagement.[17] As Stone points out, when individuals participate in multiple information streams, they learn to reinvent themselves as nodes within networks who are capable of contributing to information flows as well as receiving them. Through the interactions in a backchannel, an individual's agency in the classroom expands in interesting ways. Simultaneously interpellated as "listener," "audience member," and "peer," the student oscillates between technologically mediated subject positions. None of these positions is "purer" than the other; in the oscillating among them emerges the opportunity for the creation of new insights as one set of cognitive skills (of the listener, for example) interferes and collides with another set of cognitive practices (of texting).

Recent experiments in using a text messaging "backchannel" in the classroom suggest that the multiplication of information flows can productively stimulate conversation among students-as-peers in a classroom space.[18] But as Howard Rheingold has argued, although they are extremely promising, the existing cultural

vernaculars that emerge in these peer-to-peer social networking practices are not always applicable to academic contexts. Emergent practices such as "backchanneling," for example, can be either extremely distracting (e.g., when backchannel conversations digress from the topic at hand or become a forum for unconstructive criticism) or else highly productive as a conduit for otherwise overlooked channels of discourse. To use these tools effectively, faculty must not only understand the technological potential, but also the kinds of structures needed to focus the energies these tools unleash. This is the work of the techno-pedagogical designer.

Hybrid: *CyberOne: Law in the Court of Public Opinion*

The concept of hybridity is one of digital culture's most venerable touchstones, a term with a history ranging from Homi Bhabha's "empowering condition of hybridity"[19] to the liminal minds and bodies of science fiction cyborgs, symbiants and mutants. In digitally mediated learning environments – everything from classrooms that are wifi-enabled to virtual meeting spaces – students are increasingly comfortable occupying more than one physical or mental space at a time. On one level, the type of hybridity described here is simply a literal descriptor for the combination of in-person and networked communication that characterizes many recent experiments with digital pedagogy. On another level, though, hybridity signifies an ontological status increasingly common among today's youth that should be neither ignored nor feared. It is perhaps no accident that some of the most interesting forays into digital education achieve success not through wholesale adoption of any one "new" technology but through creatively combining, juxtaposing or cross-pollinating new with traditional practices.

"CyberOne: Law in the Court of Public Opinion" is a hybrid physical/virtual class offered through the Berkman Center for Internet and Society at Harvard Law School. The class was conceived and developed by the father-daughter team of Charles and Rebecca Nesson as an experiment in making the content of Harvard's prestigious Law School accessible to a broader public. The course is structured around a series of concentric tiers of participation, with a traditional law school class taught by Charles Nesson in physical space; an extension class led by Rebecca Nesson with paid enrollment; and a third tier comprised of an at-large constituency who participate in the course free of charge within the online virtual world of *Second Life*. Although it is far from the first of its kind, this course has drawn a great deal of attention in part because of its association with Harvard's Berkman Center, which has been a leader in progressive thinking around issues of law, policy and culture with regard to the Internet.

In addition, this class may indicate that a critical mass of interest has formed around exploring the potentials of virtual learning environments. Many of the participants in the extension class and at-large communities are themselves educators seeking experience with distributed learning. Thus, in addition to the course's focus on visual argumentation in legal contexts, CyberOne functions for many participants on a meta-pedagogical level, modeling a number of extremely effective practices, particularly with regard to creating a vibrant sense of community among participants. CyberOne's emphasis on community answers the call issued by John Seeley Brown and Paul Duguid in 2003 when they argued that universities in the digital age should pursue a "community view" as opposed to a "delivery view" of education.[20] The open social environment of *Second Life* and minimal barriers to participation for students in the at-large community create opportunities for students

to contribute their own expertise, to guide classroom activities in directions they are most interested in and to decenter the authority of the instructors in favor of learning and activity that takes place along multiple axes. As a result, the community of CyberOne has both grown and flourished into an extraordinarily dynamic, engaged community that extends beyond the immediate boundaries of the class.

According to Rebecca Nesson, part of the key to CyberOne's success lies in informal interactions that take place before and after regularly scheduled course events. Course lectures and discussions are carefully crafted for accessibility by various tiers of course participants. In-world exercises and projects are conceived to facilitate participation across these virtual communities. CyberOne additionally benefits from highly accessible subject matter and stimulating, real-world relevance in a field that might otherwise seem arcane and specialized. The focus on visual argumentation in a courtroom context has clear resonances with visual expression in everyday life as well, and *Second Life* provides a rich, 3D platform for students to explore theories of communication as well as practical examples. An additionally effective strategy has been to have students undertake group projects – everything from simple exercises and assignments (e.g., leading other students on tours of Berkman Island, CyberOne's home in *Second Life*) to full-scale collaborative work on video projects and experiments with synchronous, in-world voice communication. In addition, the CyberOne class hosted numerous supplementary events including an ethnomusicology lecture and concert; a panel discussion on the future of digital education and the collective architecting and construction of virtual buildings to be used by future classes. But as powerful as the *Second Life* learning environment is, its day-to-day functioning depends on a range of 2D web-based resources including course Web logs and wikis, a course listserve and online video and audio recordings of course lectures and events.

The effectiveness of the CyberOne class may be significantly attributed to this combination of elements that permits various points of entry and modes of participation for different groups of participants. The class is both multiply synchronous, with the law school class and *Second Life* discussions and events, and also asynchronous, allowing students to work with course materials on their own time, reading transcripts and watching videos online, as well as contributing their own reflections to various online resources. By refusing to privilege any one mode of student participation, CyberOne implicitly recognizes a key aspect of learning within the born digital generation: that different students learn best when allowed to process information and experience through various forms of engagement, at differing paces and via a multitude of technologies. It is no accident that the conception of this class originated with the multi-generational team of Charles and Rececca Nesson, who were perhaps uniquely situated to exploit the advantages of more traditional and experimental modes of pedagogy.

For all its benefits and possibilities, concerns about intellectual property, technology management and branding within *Second Life* must be addressed. One student project that originated in the CyberOne class was an attempt to organize a movement among *Second Life* residents to pressure Linden Lab to change their terms of service agreement to exert less restrictive control over the intellectual property created by users. Questions of technical infrastructure and IP seem likely to persist with evolving generations of technology-enhanced learning, and universities will have to decide on the extent to which they are willing to depend on for-profit businesses for the kinds of experiences offered by *Second Life* and its competitors such as *There* or *ActiveWorlds*. Alternative, open source educational platforms such

as *Croquet* have also appeared in recent years. High development and maintenance costs that sustain these fast-moving technologies will pose ongoing challenges for commercial as well as non-profit developers. A key factor in the evolution and adoption of these platforms will depend upon universities disposition toward questions of intellectual property and control over the "content" of university education.

Importantly, in courses such as CyberOne the design and development of the course curriculum is not driven by the affordances of any one technological platform. Instead, the course has been designed as an "information space" that crosses multiple platforms, from the physical classroom at the law school to the virtual spaces in Second Life and 2D web tools. In this case, strategies of curriculum design closely resemble information architecture, with significant challenges posed by the mapping of potential paths through dynamic pools of course content. The lesson, drawn most clearly from the experience of CyberOne is that no one platform alone is sufficient to create a sufficient range of learning opportunities for a generation of digital learners. Flexibility, hybridity and multiplicity are of crucial importance.

Media Rich: *The Institute for Multimedia Literacy*

The pedagogical experiments and research conducted at USC's Institute for Multimedia Literacy (IML) over the past decade are illuminating with regard to creative uses of media rich authoring.[21] Initially funded by a grant from Atlantic Philanthropies in 1998, the IML was housed within the Annenberg Center for Communication at the University of Southern California until 2005. It has since been incorporated into the School of Cinematic Arts, from which it administers two undergraduate programs across the curriculum at USC. The Honors in Multimedia Scholarship Program is a four-year, undergraduate program open to students across the university; while the Multimedia in the Core program introduces multimedia authoring into the University's General Education program via single-semester classes designed to reach as broad a sector of the undergraduate population as possible. Although these two programs are very different in conception, support and implementation, they represent viable approaches to thinking about the future of digital education.

The IML is devoted to the idea that, in order to be fully literate in today's world, students should be able to read and write using the languages of multimedia as readily as they read and write using text. Critical focus at the IML has emphasized developing analytical skills related to culture, media and technology across a range of traditional academic disciplines. Because it is housed within the USC School of Cinematic Arts, the IML draws deeply on traditions of visual expression, narrative and sound, which are often underrepresented in conventional academic production. Additional emphasis is placed on the emerging use of interactive media, ranging from games to immersive and mobile experience design. The goal of the IML programs is to explore the full range of expressive potentials offered by moving images, sound and interactive media, with a continuing emphasis on the integration of text as part of the expressive palette of multimedia.

But equally importantly, the IML seeks to address an urgent need within academia to keep pace with the "real world" knowledge and experience of incoming college students. The IML believes that if the academy wants to retain its relevance in a shifting cultural landscape, it must actively identify and engage with emerging practices in these areas. At the same time, IML programs are explicitly designed to

be transformative. They seek to educate a new generation of students and faculty in strategies to enhance traditional academic practices through the use of multimedia modes of expression. In the end, students at the IML are expected not only to be multimedia literate, but also to be critically aware of the embedded social, political and cultural values surrounding the uses of media, and ultimately to use this set of new communications tools in both creative and scholarly ways. The long-term goals of the Institute are to define and expand emerging scholarly vernaculars at the levels of undergraduate, graduate and faculty publication and pedagogy.

Participants in IML programs learn to "write" multimedia by first learning to critically read it. Students develop proficiency with the modes of formal analysis required for the critical evaluation of a wide range of multimedia artifacts—including images, video, sound design, information visualization, typography, interface design and interactivity. In addition, students become familiar with the major theoretical frameworks guiding the development of contemporary multimedia applications and interactive experiences. One of the key concerns of multimedia pedagogy is ensuring that students avoid the uncritical adoption of conventions of commercial or entertainment media. The IML curriculum addresses this concern by exposing students to a broad range of multimedia genres—such as argumentative, documentary, essayistic, experiential, game-based, narrative and archival forms—and by teaching the relative strengths and weaknesses of each. In their own projects, students are required to justify their authoring and design decisions to demonstrate that their use of media and techniques are appropriate to their overall communicative goal.

As students become critical readers of multimedia, they also learn to produce it in a scholarly way. Students gain experience in both individual and collaborative forms of multimedia authorship. Rather than positioning "multimedia literacy" or "scholarly multimedia" as an emerging field, the IML focuses on developing strategies of integration with existing disciplines and academic practices. The strength of the IML methodology is it's modeling of pedagogical practices that are highly mutable, scalable and flexible in implementation. Thus, IML classes are routinely taught within disciplines as diverse as history, philosophy, religious studies, geography, linguistics, and anthropology as well as more traditionally visually-oriented fields such as cinema, communications, visual arts and art history. The IML methodology, which is drawn significantly from the fields of cinema studies and communication, is readily adaptable to fields within the humanities and social sciences, many of which are in the process of adapting to accommodate or experiment with audio/visual expression and different forms of electronic publication and technologically enhanced teaching. "Multimedia," in these contexts functions essentially to catalyze, refine and promote innovations in research and pedagogy that are already emerging organically within various fields.

In consultation with faculty, Teaching Assistants and IML staff members, students learn to choose appropriate media platforms for their projects, including video and audio productions; interactive DVDs, Web sites, games, exhibitions and installations. This wide range of authoring modes necessitates a highly skilled and diverse support structure, which includes teaching assistants, technical support staff and student mentors, in addition to full-time faculty. This is clearly one of the limitations to the portability of IML's media-rich learning approach. During the first eight years of its existence while the IML enjoyed the generous support of Atlantic Philanthropies, the Institute employed a wide range of teachers, researchers, and media production specialists to facilitate and support the production of students' multimedia projects.

The challenge facing the IML in its next phase is to create a new structure for the support and delivery of its pedagogical activities. As large-scale funding opportunities such as that provided by Atlantic become increasingly difficult to obtain, the lessons learned by IML must be disseminated and adapted to the shifting landscapes of higher education.

The first step that is already in place is to create a pipeline program that employs undergraduate students who have successfully completed an IML course as peer-mentors who coach other students in the use of various media applications. As is true with other peer-to-peer systems, both sets of students learn something valuable: in mentoring a peer, the mentor's intellectual and technical understandings are reinforced and refined. The one who is being mentored learns how to respect peers for the knowledge they offer. A second step is to create the conditions for the development of a "crew-culture." This is the process whereby less advanced students (sophomores and juniors, for example) serve as members of production teams for more advanced students (graduating seniors or graduate students). Again, the peer-to-peer structure not only supports informal learning activities, but also contributes to a vibrant creative environment. Students across grade levels not only learn from each other, they learn that they are part of a community-of-practice. This is in an important part of the social literacy that all students need to learn: how to interact with people who have different skill sets, different levels of expertise, and different intellectual and cultural profiles.

As university culture gradually shifts toward greater acceptance of technologically-enabled scholarly practice, numerous questions remain. Expensive, centralized technical infrastructures that have inhibited the development of programs such as the IML at many institutions are likely to become increasingly irrelevant. The ability to capture, process, store and disseminate data-intensive media projects is becoming increasingly accessible to both students and faculty as part of consumer-grade computer hardware and software. Likewise, the emergence of peer networks and viral culture promises to radically decenter the hardware infrastructures (e.g., computer labs and media centers) traditionally provided by universities. A more important and viable legacy of programs such as the IML is the development of protocols for conceiving implementing and evaluating emerging forms of scholarship. In an evolving educational landscape where every computer user is a potential media producer, critical paradigms, reflective practices and effective assessment protocols may prove to be the key to a successful learning environment.

A Manifesto for Original Synners

By way of conclusion, we offer the following assertions in the style of a manifesto that takes seriously the challenge to address the disposition of the *born digital* generation of *Original Synners*.

Teachers Should Also Be Synners

The need to learn practices of creative synthesis cuts across all levels of digital learning. Technologically enhanced teaching strategies too easily go astray when they are driven by the affordances of technology rather than proceeding from a clearly articulated set of philosophical and pedagogical commitments. This is particularly true of new technologies that promise utopian visions of the future and appear to provide easy answers to perennial challenges. The persistent difficulties of education in both traditional and technologically enhanced environments are not

going away any time soon, and we should assume that any electronically enabled learning strategies will bring with them new problems as well as opportunities for productive experimentation. We must therefore proceed from a set of flexible commitments that find resonances in the technologies we elect to use and develop. We understand that literacies develop within a rapidly evolving matrix of social practices, technologies and communicative conventions. In order to participate actively in the most dynamic spheres of learning, educators must assume responsibility for developing their own technical skills and pedagogical vocabulary. Although an admittedly daunting prospect for many, we believe this is a crucial aspect of developing an effective pedagogy for the future. In this sense, the teachers too are synners of another order.

Mobilize Existing Dynamic Vernaculars

Foremost among our polemical commitments is the need to speak to students using languages and technologies they understand and value. This means that educators must develop the ability to speak, write—and equally important, *read*—in an evolving, dynamic vernacular that takes account of emerging social practices as well as technological capabilities. We should avoid approaches that involve grafting technologies onto existing teaching methodologies and vice-versa. Many decades of experiments have shown that new methods of "teaching with technology" offer as many pitfalls as advantages. The uneasy hybridization seen in webcast lectures and audience-response clickers demonstrates what is, in our view, a limited approach to integrating technology into education. Even some of the most promising contemporary technologies that merge the advantages of networked communities with social software, such as blogs and wikis, may in some cases simply function as high-tech updates of timeworn practices such as classroom journaling and shared notetaking. Instead, we advocate a model that is genuinely organic in conception, centered on the development of pedagogical strategies that are inextricably fused with the technologies and social practices familiar to student of the *born digital* generation. But while such collective social practices may come naturally to members of this generation, we believe there is value in theorizing and developing self-awareness about the functioning of an evolving literacy that is both participatory and collaborative.[22]

Critique the Tools

In practical terms, classroom technologies must be critically evaluated, analyzed self-reflexively, and understood as part of broader cultural, economic and political contexts. Inviting students to think critically about both the tools of technology and the uses to which they may be deployed is an empowering gesture that resonates at every level of educational exchange. This helps to position the tools of electronically enhanced learning in a zone that is resistant to the extremes of utopian techno-fetishism and technological determinism. As many cultural critics have argued, these technologies are neither good nor bad, they are both/and. This makes the process of technology assessment more difficult, but is the necessary foundation for robust creativity.[23]

The nearly century-old strategy of defamiliarization offers a useful approach to contemporary technologies whose uses are increasingly conventionalized and naturalized. While cultural facility with and acceptance of these technologies is extremely effective for the purposes of market penetration, the transparency of media and technology may serve to obscure their ideological and historical embeddedness. Principles of "good" design that dictate the clear presentation of information, a navigational scheme that is readily discernible and an interface that

facilitates access to the full range of content in a given project may all be strategies that are deliberately avoided, resisted or problematized.

So, for example, a project seeking to critique public discourses surrounding video games and violence might begin by inviting users into a game space, where the user must answer a series of questions in order to move through multiple levels of information on the topic. The use of interface metaphors that echo the content of a project is common practice and can effectively convey a cohesive relationship between form and content. The pleasures of game-play could likewise be mobilized in service of the project's goals, encouraging users/players to explore, think critically about the subject and perhaps test their own reactions to relevant examples. On the other hand, an interface that resisted or drew attention to the conventions of game design or navigation might prove to be equally effective, encouraging the user to be aware of the apparatus of the computer, his or her own expectations, and perhaps mobilize the equally powerful effects of strategic frustration, uncooperative technology and recalcitrant design. Thus, perhaps a user would experience a simulated "crash" at a strategic moment or attempts to navigate through the project would be deliberately frustrated and the user would be invited to reflect on the intensity and emotional quality of their reaction in relation to the debate over game violence.[24]

Against the Grain of Technology

We believe that a creative relationship to educational technology proceeds from the assumption that tools are made to be broken, misused, disassembled, reverse-engineered, hybridized, and brushed against the grain. We must be willing to invest a certain amount of effort in the sometimes difficult process of engaging with the way technology functions, both at the level of hardware and of code. Databases and object-oriented programming, for example, offer both powerful technical capabilities as well as rich metaphors for describing emerging configurations of intellectual thought and practice. The goal is not necessarily to become professional technologists, but to develop greater sophistication in our own technologized practices so that we may continue to play an important role in the education of these students-of-the-future. They need us as guides, as coaches, and as voices of support and challenge. In the end, we must be willing to adapt, evolve and productively fail. We must consciously decide which aspects of the teaching/learning process we are unwilling to compromise and develop boundaries that are firm but moveable. And finally, we must proceed from an ethics not only of education but of technology as well.

Try Non-Standard Tools

An ethical approach to technology will maintain a degree of skepticism about the consumerist frenzy surrounding the hardware and software industries. Work created with low-tech alternatives and underutilized tools may help resist the allure of high-tech commercial production values. Indeed, deliberately low-tech, DIY or handmade aesthetics may well prove to be more interesting and creativity-inducing than the conventions that commercial media production and "industry standard" tools tend to offer. Put bluntly, we believe the technologies and authoring strategies we use in the classroom should reflect and reinforce the values we hold in the realms of culture and pedagogy. To this end, we see great potential in making use of the rapidly expanding range of free and open source software tools that is currently available and in creating awareness about the ideological and historical embeddedness of any technology.

Among the numerous, powerful commercial software applications that are widely used in educational contexts, Adobe's Flash and Director offer students the ability to develop skills with "industry-standard" development platforms. Likewise, video editing and handling programs such as Apple's FinalCut Pro and DVD Studio Pro, Adobe's Premiere and Encore DVD, and Avid Xpress familiarize students with tools and conventions that are analogous to those used in commercial film and television post-production. And while there is value in providing students with "real-world" technical skills that may assist them with obtaining internships or entry level jobs upon graduation, an equally convincing case may be made for an approach that emphasizes *teaching students how to teach themselves software*. We believe this will produce students who are able to move more fluidly from one platform to another; to adapt to new applications or revisions of existing programs, and most importantly, to develop their own conceptual literacy about how software functions and the uses to which it may be put.

Thus, in conjunction with introducing commercial software, we advocate exposing students to authoring tools that function outside of a commercial economy. Examples include a free, downloadable program called the Korsakow System, an interactive media handling program developed by Florian Thalhofer at the University of the Arts in Berlin.[25] Korsakow allows users to create sophisticated interactive experiences without the need for specialized programming knowledge or database support. Principles of interface design and interactive structures may be fruitfully experimented with using a number of low-cost authoring tools based on Apple's QTVR format. Dating back to the early 90s, the often overlooked QTVR format, allows designers to embed hotspots and links to external media objects or web pages within a dynamic, panoramic interface format. The QTVR format has often been regarded as a novelty in spite of its surprisingly versatile range of interface possibilities and cross-platform web-deliverability. Another free, open source alternative to electronic book publishing and mainstream programs such as Adobe Acrobat may be found in Sophie, a product of Voyager founder, Bob Stein's Institute for the Future of the Book.[26] Building on the success in educational circles of its predecessor, TK3, Sophie promises to deliver a rich, text- and media-based authoring environment for non-technical users without the need for design or programming experience. And finally, basic principles of code may be taught using free software programs such as Ben Fry and Casey Reas' Processing,[27] or the coding language designed at the MIT Media Lab to introduce children to graphical programming, Scratch.[28] The limited range and non-commercial aspirations of such programs places emphasis on developing conceptual sophistication rather than final polish. We believe this emphasis on process over product may allow students to pursue more experimental, concept-driven creative and critical production.

Our challenge as educators, once students learn how to critically synthesize knowledge from the information that that comes to them from multiple sources, in multimediated forms, and through multiple social networks is to teach them a value proposition: how will they create culture differently? This shifts the discussion about the purposes of education into a different register: one that focuses not on the act of critical consumption but rather on the act of creative production. The real digital divide may be more about the differences among those who consume what others produce, and those with access to the tools and the intellectual frameworks to create the stuff that circulates via these mixed reality networks. Our challenge is to help Original Synners understand not only their creative potential as cultural prosumers, but also their role as cultural mediators of the futures we all will inhabit.

Back to the Future

Let us return once more to the fictional future scenario to consider one more possibility inherent in the wide-scale adoption of digital learning as a new educational paradigm. In our enthusiasm to explore the possibilities of distributed online digital learning spaces, we may set in motion a movement that radically evacuates the communal rituals of learning and teaching. Another possible *unintended* consequence of the turn to digital learning as an educational platform is the creation of a class system that institutionalized differential access to embodied, communal ritualized learning experiences. In this version of the digital divide, those without resources are consigned to virtual worlds and online courses, where they never meet face-to-face with teachers, coaches, or peers. Only the wealthiest of students will be able to afford to engage the personal attention of a teacher or professor, to be in-residence in specially equipped learning environments, and to learn the hands-on skills that require individualized instruction and coaching. The new digital learning spaces may indeed foster the development of new social rituals and logics of sociality, but they will be dramatically impoverished by virtue of the radical disembodiment of all participants. This suggests yet another commitment that must be addressed in creating a pedagogy for Original Synners: the need to remember the importance of embodied learning, teaching and making, which is to say that the deployment of new digital tools and learning spaces must involve embodied social interactions for the purposes of community building and material world building. Our futures depend on it.

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1. Raymond Williams might have called this sensibility the generation's dominant "structure-of-feeling." We use the term "disposition" to make connections with the work of John Seely Brown and Douglas Thomas who analyze the contours of gaming disposition for the purposes of elaborating the educational potential of gaming paradigms.
2. Science fiction readers will recognize references to the following: Octavia Butler's *Xenogensis* Trilogy; Orson Scott Card's *Enders Game* series; and the Akira manga series. The game assessment grid is inspired by the Piers Anthony *Apprentice Adept* series. Ditto blanks are mentioned in David Brin's novel, *Kiln People* (2002). Biolution devices are biological manufacturing systems/devices from Paul Black's novel, *The Tels* (2003). Rudy Rucker developed the concept of Flickercladding in his novel *Wetware* (1988). Bush robots—branching "ultra-dexterous" robots—were first envisioned by Hans Moravec in 1997, but also show up in numerous science fiction works. Tracer birds--a mechanical surveillance drone—are mentioned in Roger Zelazny's novel *Changeling* (1980). Extra-factual memories were central to the Philip K. Dick novel, *We Can Remember It for You Wholesale* (1966). Schooling ship-bound children of the crew off-world exploration missions was referred to in various *Star Trek* episodes. Serious gamers will understand the references to the *Tomb Raider* games; board game historians will recognize the TDK classic called *The Stupid Game*.
3. A Delphi group is a large group of people used as a statistical sampling resource.
4. As of early 2007, MIT's Open CourseWare consortium includes universities on five continents. ocwconsortium.org
5. www.cmu.edu/oli
6. cnx.org
7. openlearn.open.ac.uk
8. Open source software is one mode of non-hierarchical, communal programming in which a loosely affiliated network of programmers contribute their efforts to a code base without direct compensation. With some exceptions, the resulting software may be used in commercial applications as long as the code remains openly available and changeable by members of the community at large. At present, the commercial impact of open source programming on Internet-based technologies is incalculable, with the majority of network servers, databases and operating systems utilizing some form of open source software.

9. creativecommons.org
10. archive.org
11. eff.org
12. www.opensource.org
13. www.prelingerlibrary.org
14. As open source movements proliferate throughout global technological cultures, we anticipate an increased interest in the development of open (educational) content. Although a bit off topic for this essay, this cultural movement will also be helped by an increase in public animosity in response to lawsuits over copyright infringement from the entertainment industries.
15. www.oercommons.org
[16] A mashup may be defined as a combination of two or more data sets or information processing tools that create access to new constellations of meaning. For example, a tool that combines the Google maps API with the geographic tags deployed by users of the Flickr photo sharing service results in a mashup in which photos are displayed on a map in proximity to the locations where they were taken (see Stamen Design's Mappr at http://www.mappr.com).
17. radar.oreilly.com/archives/2006/03/etech_linda_stone_1.html
[18] See, for example, Justin Hall and Scott Fisher's "Experiments in Backchannel: Collaborative Presentations Using Social Software, Google Jockeys and Immersive Enivronments" presented at the CHI conference in April 2006 (http://nvac.pnl.gov/ivitcmd_chi06).
[19] Bhabha, Homi, *Nation and Narration*, ed. Homi Bhabha (New York: Routledge, 1990) 227.
20. According to Brown and Duguid, conversation among peers is what transforms copresent groups of students into interpretive communities, capable of analyzing and reaching consensus about matters of significance in their lives. "The University in the Digital Age" (2003) available at: www.johnseelybrown.com/DigitalU.pdf
21. Anne Balsamo is the Director of Academic Programs and Research at the Institute for Multimedia Literacy; Steve Anderson is the Director of the Honors in Multimedia Scholarship program at the Institute for Multimedia Literacy.
[22] A particularly promising attempt to synthesize these practices in terms of "literacy" is Howard Rheingold's collectively authored "Participatory Media Literacy" wiki: http://www.socialtext.net/medialiteracy
[23] See Anne Balsamo's forthcoming book, *Designing Culture: A Work of the Technological Imagination* (Duke UP), for a discussion of the philosophical foundation of robust technological imagination.
[24] This example is based on an undergraduate multimedia project titled "Videogame Subjectivity," created at the Institute for Multimedia Literacy in Fall 2004 by Erik Gieszelmann and Grant Toeppen.
[25] The Korsakow System is distributed free of charge for non-commercial uses by the Korsakow Foundation, a non-profit organization supported by Mediamatic Amsterdam http://www.korsakow.com
[26] See http://www.futureofthebook.org
[27] http://processing.org
[28] http://weblogs.media.mit.edu/llk/scratch