3   Networks, Decentered Systems, and Open Educational Futures

Whereas the soft openings style of thinking about the curriculum examined earlier has emerged from a mix of behavioral competence and business innovations, this chapter focuses on an emergent curriculum ideal of networked connections, complex systems, and "open education." It examines how ideas about learning in an emergent open educational commons are linked to questions about the curriculum. Key issues raised by the networked version of the curriculum of the future are those having to do with the connectedness of knowledge areas and how they are defined and with the connections between the curriculum and the kind of society desired for the future.

The Death of the Center

The concept of networks has assumed huge significance as a twenty-first-century style of thought. The language of our times, it has been claimed, talks of systems, complexity, feedback, matrices, lateral connectedness, associations, hybridity, fluidity, multidimensionality, and connectivity. Networks do

not only take the form of electronic communications (they are of course a very old form of social organization), though it is in the realm of the high-tech that networks have really entered the public imagination.[1] In comparison to the twentieth-century industrial era of mass production, centralization, and organized hierarchy, pinpointed by the image of a single central dot to which all strands led, the twenty-first century digital age has been defined by the "death of the center" and its replacement by a mesh of many points all linked multidirectionally to webs and networks. The current era is characterized by the plasticity of information, the perpetual beta, an open, decentralized approach to information, and open-source politics, all powered by the Internet's centrifugal forces.[2] In such a smart decentralized world of networks, it is argued that the dynamic and the mobile are challenging centralized bureaucracy, dialogue and cooperation are preferred to hierarchical authority and order, flexibility seems more important than routine, and a counter-culture of the Internet geek has taken over for the dark-suited manager of the big firm. Twenty-first century society is a lateral society of fluid networks rather than a vertical society of totalizing structures.[3]

Network-based technologies introduce new possibilities for interaction, common dynamics, and participation into everyday life and learning. As a result, researchers working in the field of digital media and learning have explored the significance of "networked publics." Networked publics refer to the intersections of domestic life, nation-state, mass-culture and commercial media, and everyday life in the context of a convergence of mass media with online communication. Networked publics, like many other types of publics, allow people to gather for social, cultural, and civic purposes, and they help people

connect with a world beyond their close friends and families. As a result, networked publics now increasingly constitute the social groups that structure young people's learning and identity. They provide opportunities for engagement in hobby-based or "interest-driven" publics that exist outside school or existing friendship networks.[4]

According to research on networked publics, learning is now increasingly decentered and dispersed in time and space, horizontally structured, networked and connective, and convergent across many different media. In a networked world, learning can take place online as well as in high schools, museums, after school programs, homes, business, broadcast media, public libraries, and community settings. The emphasis is increasingly on dispersed, decentralized, and virtual learning taking place fluidly across lifetimes, social sectors, and media, with the Internet itself imagined as a learning institution. Such arguments are set against schools understood as innately conservative institutions that continue to rely on structured hierarchical relationships, a static print culture, and old-style transmission and broadcast pedagogies that are at odds with the networked era of interactivity and hypertextuality.[5]

At the same time, developments in the "open access" of information and knowledge in higher education and scholarship have begun to point to radical new possibilities for schooling. Open access means putting peer-reviewed scholarly material on the Internet to be made available free of charge and free of most legal restrictions. Some major research universities have pioneered open access as a way of bringing down the public barriers to research. MIT led the way with OpenCourseWare, while Harvard University's faculty of arts and science has adopted an open archiving mandate.

In the emerging "open education" paradigm, educational materials are digitized and offered freely and openly to educators and learners to use, customize, improve, and even redistribute in their own teaching, learning, and research. A series of major reports has advocated for open education in the United States and Europe, contributing to the establishment of new "knowledge ecologies," "knowledge cultures," and a "global knowledge commons" based on a new collection of values of openness, an ethic of participation, and an emphasis on peer-to-peer collaboration. Open education is an educational paradigm for a seemingly "open era" based not only on a technological discourse (open-source, open systems, open standards, open archives, and so forth) but on a change of philosophy that emphasizes ideals of freedom, civil society, and the public sphere.[6]

Consequently, arguments in favor of informal networked learning and arguments for open education have been enrolled into arguments advocating for curricular change. The following case studies exemplify the potential for openness in the connected curriculum of the future.

Systems Curriculum

Quest to Learn in New York City offers a blueprint for a possible future of institutional schooling after the death of the center. The school's main documents emphasize "systems thinking" and "learning about the world as a set of interconnected systems," and it is "committed to graduating strong, engaged, literate citizens of a globally networked world." Based on this strong systems language, it reimagines "school as just one kind of learning space within a network of learning spaces that spans in school, out of school, local and global, physical and digital,

teacher led and peer driven, individual and collaborative."[7] Quest to Learn (Q2L) is an ideal-type school for a dispersed field of interest-driven learning in networked publics.

The entire Q2L experience is designed around the notion of "game design and systems." It establishes the architecture and culture of videogames as its core principles for curriculum design. This does not mean that the student experience involves a lot of playing videogames. Instead, the learning experience is designed according to the principles of videogame design. In turn, it assumes that videogame design embeds effective learning principles in highly motivating contexts. Q2L is an institutionalized version of the argument that good videogames make effective learning machines. For example, videogames present players with problems to solve that are designed to become progressively tougher to solve, offer continual feedback on progress, are customizable according to different styles of play, enforce repeated cycles of practicing skills as a strategy for accomplishing goals in authentic contexts, and offer intriguing situations and characters that require deep affective player investment.[8]

Moreover, according to Q2L documentation, videogames constitute an ideal technology for promoting systems thinking. Systems thinking refers to the understanding that any system—social, technological, natural—maintains its existence and functions through the dynamic interaction and interdependence of its parts. Systems thinking stresses the unintended consequences of complex interactions and relationships. It is antithetical to the traditional curriculum of insulated subjects, isolated facts, and knowledge learned out of context. As complex systems, videogames are positioned at Q2L as a more appropriate medium for the future of learning than a conventional curriculum of separated subjects and linear knowledge domains.

In order to support its systems thinking focus, Q2L "posits learning as context-based processes mediated by social experiences and technological tools," a "highly social endeavor" that takes place through "situated practices" within "communities of practice":

In this way, a situated-learning view stipulates that learning cannot be computed solely in the head but rather is realized as a result of the interactivity of a dynamic system. These systems construct paradigms in which meaning is produced as a result of humans' social nature and their relationships with the material world of symbols, culture, and historical elements. The structures, then, that define situated learning and inquiry are concerned with the interactivity of these elements, not with systems in the individual mind.[9]

Through this approach, students at Q2L are engaged in situated and authentic, real-world learning experiences. The distinct Q2L conceptual framework for the curriculum hybridizes the systems language of videogames design with the systems language of situated cognition derived from the learning sciences.

Besides the systems focus, Q2L also has a strong emancipatory ethos. It positions its students as "sociotechnical engineers" who can create systems (games, models, simulations, stories). By "designing play," it claims, "students learn to think analytically, and holistically, to experiment and test out theories, and to consider other people as part of the systems they create and inhabit." The built-in creativity and design focus seeks to produce students who are empowered to act and make and participate in global dynamics rather than receive and consume.

In order to do so, Q2L also provides a coherent, structured curriculum model that claims to juxtapose state standards with twenty-first century skills. The curriculum is organized as interdisciplinary knowledge domains instead of separate subjects.

Each interdisciplinary domain structures learners' experience in integrated expertise such as researching, theorizing about, demonstrating, and revising new knowledge about the world and its constitutive systems.

The integrated domains are described as follows. "The way things work" integrates science and math and involves learners dismantling different kinds of systems and modifying, remixing, and inventing their own. In the "being, space and place" domain, students study the social, temporal, and spatial forces that shape the development of ideas, expression and values through combinations of social sciences and English language arts. "Codeworlds" blends language arts and math and computer programming and involves students decoding, authoring, and manipulating meanings through the symbolic codes, including those of literacy, numeracy, and computation. "Wellness" situates personal, social, emotional, and physical health within systems of peer groups, family, community, and society. Finally, "sports for the mind" emphasizes the fluent use of new media across networks for careers and civic engagement in the twenty-first century. The interdisciplinary curriculum is delivered through problem-based "missions," "levels," and "quests" that are organized according to basic videogame architecture.

Q2L's integrated curriculum embodies a form of networked, collaborative, digital interdisciplinarity. Its keywords are "systems," "dynamics," "integration," and "hybridization," and it seeks to prepare students for a world it characterizes as globally connected and complex. To act in such a world, students need to be able to recognize patterns and identify structures, think connectively and creatively, be inventive and innovative, adopt and tolerate multiple cultural perspectives, exhibit empathy and reciprocation, understand what it means to be an active global

citizen, understand and respect the self and others, and understand the various modes of new media communication.

Despite the high-tech, digital interdisciplinarity discourse of game design, then, it is also constituted by a more affective, emotional, and ethical discourse. Q2L is a smart, open, dynamic curriculum of the future that nonetheless continues to resonate with a much longer curricular legacy in the United States. The basic intellectual architecture is derived from John Dewey's insistence on "inquiry," "experience," and "learning community," as remixed through the discourse of open systems and networks and an emphasis on sociotechnical engineering. It amalgamates participation in the economic sphere with notions of community and local responsibilities in the cultural sphere. The first is promoted through emphasizing technological competence and the soft skills required for flexible working; the latter through appealing to authentic and learner-centered or "personalized" learning. It offers a hybrid language of learning that is both high-tech but also emotionally "high-touch."[10]

Additionally, Q2L's curriculum for the future represents the world in terms of complex open systems. Q2L's version of complexity theory emphasizes emergence, nonlinear dynamics, uncertainty, feedback loops, self-organization, and interconnection. In complexity terms, learning, curriculum, and knowledge are understood as continuous invention and exploration, produced through complex interactions among people, action and interaction, and objects and structural dynamics that all produce emergent new possibilities. New problems emerge at the point of solving others; knowing emerges with the appearance of new problems as we participate in the world.

Put educationally, complexity theory promotes a sense of openness and permits the possibility of alternative futures. A

complexity curriculum is open, dynamic, relational, creative, and systems-oriented, it involves processes of cross-fertilization, pollination, and the catalyzing of ideas to form a webbed network of connections and interconnections, and it emphasizes learning not through direct transmission from expert to novice, or from teacher to student, but in a nonlinear manner through a class exploring a situation/problem/issue together from multiple perspectives.[11]

The complexity approach taken up in Q2L treats curriculum not as product for imposition but as a process of emergence and interaction. It is forward-looking in that it embraces the contingency and uncertainty of educational outcomes. It recognizes processes of inquiry and exploration, and it mobilizes a vocabulary of networked interactions and webbed learning. The curriculum, from a complexity perspective, is an open system of constant flux and complex interactions rather than a closed system of prescriptions and linear progressions. A complexity curriculum emphasizes students as knowledge producers, organizing and constructing knowledge as they interact, an argument that resonates surprisingly with the political "pedagogies of the oppressed" of Paolo Freire and the radical progressivism associated with John Dewey.[12]

Networked Neoprogressivism

The complexity curriculum of Q2L remixes an emancipatory politics of participation through the globally dynamic, complex systems of networked society. Yet it is certainly not alone in mixing up technical and progressivist codes for thinking about the future of learning. It is part of a vision that might be termed "networked neoprogressivism." Networked neoprogressivism

consists of a set of statements and practices that articulate the future of learning in terms of self-organizing webs of activity blended with a reinterpretation of progressivist educational values and aspirations.

For example, the New Basics curriculum program trialed in Queensland, Australia, was explicit about its theoretical roots in radical progressive pedagogy. A booklet for teachers draws from radical progressivist theory, alongside sociocultural psychology, to craft an approach that requires the solution of "substantive, real problems" in learners' worlds, includes "integrated, community-based tasks," and involves teachers as "mentors" scaffolding" the activities of "novice" students.[13]

Elsewhere in the project documentation, the New Basics is conceived in dynamic networked terms. Rejecting the curriculum as a "central authority" based on "economies of scale for publishing, distribution and implementation of texts using print media," the project advocates for "using online, interactive technology for local, regional and global curriculum development and renewal" and the "rapid prototyping, development and revision" of more specialized materials based on "economies of scope." Again, a dynamic decentralization discourse associated with the Web is synthesized by the New Basics documents with a progressive, emancipatory vocabulary of real-world problem-solving.

Perhaps the most radical neoprogressivist view is of a future "post-school era" where the formal institutions, personnel, instruments, and resources of education have been replaced by self-disciplined learning collectives, crowds, and communities, all connected by the Internet. In an imagined post-school era, schools disappear as young people increasingly learn through networks, drawing on personal and domestic digital

technologies as sources of knowledge and ways of connecting with others. Instead of prizing disciplinary knowledge, a "curriculum 2.0" acknowledges experiences such as collaborative learning, personal development, self-monitoring, creativity, and thinking skills.[14]

The ideal of an "open source curriculum" put forth in the curriculum 2.0 vision values teachers and learners participating in a wiki culture of production and collaboration over learning materials and resources. The neoprogressive, connectivist curriculum 2.0 is rooted in a pervasive digital discourse of 24/7 learning, nomadic learning networks, transmedia convergence, smart mobs, crowdsourcing, user-generated content, opensource, DIY media, cloud culture, and so forth.

The School of Everything, for example, is a simple Web platform that allows anyone who has something they can teach to link up with anyone who would like to learn it. Its founders describe it as a response to the outdated rigidity of school, and they cite the key source of inspiration as the Free U in 1960s California. It aspires to promote a culture of informal teaching and learning. The School of Everything "manifesto" mixes an empowering people-centered appeal—the concept that "everyone has something to teach," "everyone has their own way of learning," "all subjects are important," and that "people are brilliant, inspiring, generous, and smart—with a critique of "expensive" formal education and of "overrated" qualifications and credentialism.[15]

The post-schooling scenario reanimates the countercultural "deschooling" agenda of the 1970s for the era of eBay and MySpace, reaffirming its attack on institutionalized schooling, its assault on assembly-line learning, and its commitment to self-determined learning through informal networks and

community bonds. The radical idea of learning webs imagined by deschoolers is now, it seems, more realistic as learning networks are made possible through the Internet to society as a whole. A much more convivial new hidden curriculum, like the deschooled society of progressivist imagining, facilitates communication, cooperation, caring, and sharing between free agents and distributes learning into a nomadic network of authentic practices, cultural locations, and online spaces.[16]

According to these views, isolated and insulated educational institutions are now being challenged by a much more pedagogically polygamous range of incidental, non-institutionalized learning relationships and attachments. The result has been a restructuring of the spatial and temporal boundaries of education, with learning to be extended beyond learning institutions into virtual environments and stretched across the life span instead of concentrated in youth. All boundaries between informal, interest-driven and formal education are imagined as increasingly flexible and even porous. Formal learning is imagined to be optional or flexible in terms of attendance. Learners are imagined as taking more control over the selection of learning resources and sources, with learning content more customized, malleable, and adaptable. New spatialities and temporalities of learning are opened up by the flexing of timetables, the compression of space by real-time digital communication, and the virtual erasure of school walls. Schools are reconceived as learning spaces designed to afford different ways of working (team working, personal reflection, information access) rather than organized rigidly around faculties and subject disciplines. Learning is decentered and reimagined to be taking place fluidly and flexibly in a utopian dispersed network of formal settings and informal media environments. Networked neoprogressiv-

ism is a connective utopia where anything goes with anything else!

Whether the desire for a "technical fix" expressed in a post-school utopia will, however, lead to the high-tech deschooling of society, "leaving us all enmeshed in Illichian webs and nets," is debatable, and it seems more likely that education will continue to be "framed within the competing claims and complexities of democracy and capitalism."[17] The idealization of networks in the imagining of the connective curriculum of the future, therefore, needs to be understood critically. The connected curriculum of the future is no value-neutral or depoliticized utopia: it is enmeshed in complex social, economic, and cultural trends. For starters, network discourse is a form of technological determinism that reduces all other phenomena, relations, and forces to the logic of technological change.[18]

More particularly, critics claim network technologies have brought about a greater emphasis on fast time and short-termism over long-term thinking, while the reality for many teachers and learners remains that of centralized and hierarchical "techno-bureaucracy" rather than open educational "cyberpedagogy." Decentralized control over curriculum and learning resources is not always liberating, but may bring about disunity, disconnection, desolidarization and disadjustment, dysfunctionality, destructive conflicts, exploitation, and other negative effects. The network-centric and horizontal utopia of the future of education systems tends to flatten out and glide over persistent educational inequalities and asymmetries; it idealizes community, respect, equal power, and entrepreneurialism, but it elides over disciplinary problems and differences, reduces knowledge to marketable commodities in the form of "soundbites," and reimagines education as "learning bubbles."[19]

Wiki-fied Futures?

Informed by network thinking, centrifugal schooling lashes together and hybridizes a range of "open" educational theories and ideas about complex networked systems into an emergent way of thinking about schools in the twenty-first century. An emergent, open, networked ideal of curriculum design for centrifugal schooling is now part of a twenty-first-century style of thought about the curriculum that consists of concepts such as complexity, connectivity, convergence, emergence, interactivity, openness, playfulness, systems, and webs. This style of thought does not only seek to explain a new social world to which the curriculum ought to be reformed; it helps to construct that world, as seen at Q2L. Q2L uses cutting-edge pedagogical and instructional techniques, twinned with innovative technologies, to create new kinds of learners with new ways of thinking, seeing, and practicing in the world.

The generalization and idealization of the learning benefits of networks into a style of thought is an aspect of wider social, economic, and cultural changes. Its emergence is shaped by the interactive effects of globalization and the digital revolution as well as by economic restructuring processes that drive privatization, deregulation, and open markets.[20] The mindset of computer engineers and the entrepreneurial hacker culture of Silicon Valley—the cyberlibertarian "California ideology" as it's sometimes known—has now diffused throughout popular culture and worked its way into the styles of thought, the minds, and the imaginations of the public, as well as into the business plans of transnational media companies.[21] The smart networked vision of the curriculum draws its impetus from "apologists for the flattening of the world, and bureaucratic enforcers of the

proclaimed new global order" who envisage society in terms of benevolent network connections and relations.[22] They channel a new vocabulary of "wikinomics" and "wikicapital" associated with deregulated "open markets" into the new soft logic of learning.

For example, major supranational organizations like the OECD and UNESCO, as well as transnational computing corporations, all now spearhead programs encouraging open education based explicitly on the interactive culture of the Internet and the utopian ideal of user-generated knowledge embedded in YouTube and Facebook to produce a kind of "democratic" wikified vision for the future of the curriculum.

Yet letting the "geeks of Silicon Valley" make decisions about education, albeit at a distance, may mean that the "future of education in the digital age will be determined by our judgment of which aspects of the information we pass between generations can be represented in computers."[23] The implications for curriculum are significant. If the curriculum is a relay of knowledge between generations, then a reduction of this relay to only media that can be computerized has the potential to exclude significant cultural materials and to promote narrowly specified ways of being and thinking.

New technologies have therefore been criticized as part of a "politics of public miseducation" in the curriculum, "the latest technological fantasy of educational utopia, a fantasy of 'teacher-proof' curriculum" that eschews "interdisciplinary intellectuality, erudition, and self-reflexivity."[24] According to such critiques, network discourse and rationality has begun to install in education particular kinds of design decisions and algorithmic assumptions that are rooted in the logic and embedded values of computer engineering rather than in the intellectual

concerns of educators. The emerging style of curriculum think-
ing is a wiki-fied geek style originating from well outside the
normal institutions and mindsets of educational systems. This
points to the need to understand how new actors from outside
the usual institutions of the education system—and the poli-
tics and values they catalyze—are now involved in educational
designs for the future, as the next chapter shows.