1 Introduction: Prototyping and Researching the Curriculum of the Digital Age

Digital media and learning has become a critical area for educational research in the twenty-first century. Yet little research has been carried out on the practical and conceptual implications for the school curriculum in the digital age. This report asks a very simple question: what might be the future of the curriculum in the digital age? It examines a series of twenty-first century curriculum innovations in order to show how various ideas about the future curriculum are now being styled into school practice, and it seeks to understand the emerging issues raised by meshing the curriculum and digital media together.[1] It explores a range of contemporary social, political, economic, and cultural issues facing the future of the curriculum and examines the production of ideas about the practical organization and planning of a future curriculum. What kinds of visions for the curriculum of the future are being imagined, invented, and promoted? The main argument is that any curriculum always represents a certain way of understanding the past while also promoting a particular vision of the future. To use pragmatist philosopher William James's metaphor, the curriculum is a "saddleback"

with both a rearward-looking and a forward-looking trajectory. It expresses simultaneously a legacy from the past and aspirations and anxieties about the future.

The case studies are a selection from a growing number of curriculum innovations that correspond with a new globalized era of networked technologies, communications, and digital media. They originate from the United States, the United Kingdom, and Australia, and they involve a variety of actors and agencies from the public, private, and philanthropic and nonprofit sectors. These programs act as micro-level sites of curriculum reform that refract macro-level ideas about social and technological transformation. The analysis asks what these curriculum prototypes select from the past, how they represent the present, and what ideas they generate about the future. Collectively, they represent a new "style of thought" about the school curriculum for the digital age.

In light of the aspirations and objectives of these programs, what could the curriculum of the future look like? What knowledge should it contain? What visions of the future do these curricular prototypes promote and catalyze? What individuals and organizations are involved in designing and promoting them, and on what expertise and authority? What wider social, cultural, economic, and political associations and objectives are embedded in them? And, most important of all, how do such curricula seek to shape the minds, mentalities, identities, and actions of the young?

Microcosmic Futures

The curriculum is a microcosm of the wider society outside school. It constitutes what a society elects to remember about

its past, what it believes about its present, and what it hopes and desires for the future. It is both retrospective and prospective, and it encourages learners to look back at the past and look forward to the future in particular ways. The design of a curriculum shapes the minds and mentalities of young people and encourages them to understand and act in society in particular approved ways. As a result, the local detail of all curriculum reform needs to be understood and grounded in long waves of societal change that are pursued from the past into the present and from there projected into the future.[2]

Understanding curriculum reform in this way alerts us to how major reform movements and policies such as A Nation at Risk and No Child Left Behind have been assembled through debates, conflicts, and political activities that have themselves been shaped through other social and historical events, and that have led to the production of normative visions of the future. In fact, it was A Nation at Risk that, during the Reagan administration in 1983, argued the case for educational reform on the basis that "knowledge, learning, information, and skilled intelligence are the new raw materials of international commerce" and "the indispensable investment required for success in the 'information age' we are entering." A Nation at Risk presented long waves of change—in the form of the globalization of commerce in an "information age"—as the context for the promotion of a future "Learning Society" that was to be extended into the local details of the traditional institutions of learning, schools and colleges, and beyond them into the microlocalities of "homes and workplaces; into libraries, art galleries, museums, and science centers; indeed, into every place where the individual can develop and mature in work and life." Since the early 1980s, then, educational and curricular reforms have been widely premised on the

perceived incapacity of schools to keep pace with technological change and its social and economic implications. Much of this argument remains familiar in talk of digital age reforms some thirty years later, as we continue to ride the crest of a long wave of educational change.[3]

All of the curriculum prototypes examined in this report offer a view of how the curriculum might be redesigned and reformed in the perceived context of the digital age. They all start with the same basic assumption that new and constantly changing technologies, accompanied by complex, long waves of social and technological change in the economic, political, and cultural dimensions of existence, have contributed to the need for curriculum reform. These assumptions are part of an emerging "style of thinking" about modern society. The dominant style of thinking about society in today's digital age is saturated with "cybernetic" metaphors of information, networks, nodes, dynamics, flexibility, multiplicity, speed, virtuality, and simulation. This is not to say that we live in cybernetic societies, but in societies that are increasingly understood and consequently shaped through a cybernetic style of thought. A style of thought is a particular way of thinking, seeing, and practicing. It designates what counts as an argument or an explanation in a particular field, underpinned by key terms, concepts, references, relations, and techniques of intervention. But it doesn't only explain: it actually shapes and establishes the problems, difficulties, and issues for which an explanation is required. Rather than being solely explanatory, then, a style of thought modifies or remakes the very things it explains.[4]

The trend in curriculum making examined in this report is therefore far from a neutral or nonpolitical activity: it involves a cybernetic style of thought that pervades attempts both to

explain and to remake the links between curriculum and society in the digital age. The curriculum of the future is not "out there" waiting to be discovered, but must be imagined and constructed. It is important to treat these programs and their objectives not simply as microcosms of a world that already exists, but as microcosms of imagined futures being prefiguratively practiced, or microcosmic futures still in the making.[5]

Because aspirations for the curriculum are linked together with the global concerns of the digital age, the future of the curriculum has become a subject of intense debate. Perhaps more than any other aspect of schooling, new technology and digital media are matters of significant interest for a wide range of parties that extend beyond the formal organs of education systems. For example, almost all of the transnational computing companies have significant educational programs and funding initiatives. Microsoft, Google, Mozilla, Apple, Cisco, Hewlett Packard, and so on have all made high-profile statements about the need for schools to keep pace with technological advances. Commercial participation in curriculum design and research is now a serious matter for research.[6]

Besides governmental and commercial interests, many philanthropic organizations, foundations, charities, and nongovernmental and nonprofit organizations have also put digital media and learning at the heart of their operations. Political think tanks, pressure groups, and semi-governmental agencies too have attempted to prioritize technology on the educational policy agenda. Supranational and multilateral bodies such as the Organisation for Economic Co-operation and Development (OECD), the United Nations (UN), the World Bank, and the United Nations Educational, Scientific and Cultural Organization (UNESCO) have all made recommendations and specifications

for educational programs. All of this is evidence of a transformation in how the job of public education gets done—increasingly, by third parties doing parts of its work from within. More than ever, curriculum planning is being performed in an "unreal world" at a distance from the day-to-day tasks of schools.[7]

Additionally, many of today's digital kids seem to recognize the problem of the content curriculum, standardized testing, and credentialing just as well as many critical curriculum scholars, digital media researchers, and global Internet entrepreneurs do. According to some optimistic accounts, young people today are sophisticated cultural producers of digital media, actively creating, remixing, and circulating content online in complex ways that far outstrip anything demanded of them by the traditional subject curriculum. More critical analyses suggest that they are being lured by a seductive commercial curriculum and public pedagogies of advertising into cultures of consumerism and materialism. Taking a more balanced view, digital media, as an important part of young people's lives and cultural experiences, offer forms of participation, community, belonging, and communication that are important and meaningful; at the same time, the meanings that may be derived by young people are subtly shaped and limited by consumer culture.[8]

The task of reforming the curriculum of the future, then, is a matter of political change in education systems as well as a matter of changing what teachers and children do in schools. Curriculum reform changes the nature and structure of the connections between various political centers and nonpolitical authorities and the distant microlocalities of educational practice and experience.[9] The case studies discussed in this report are the products of a variety of surprising alliances between actors and agencies from well beyond the confines of traditional

government bureaucracies and education systems, and from a variety of intellectual sources rather than from any single political perspective, academic orientation, or particular ideological position. In this synthesis and juxtaposition of agents and agencies, all sorts of arguments, rationales, and objectives for the curriculum are bundled up and packaged together. The curriculum prototypes examined are examples of an increasingly globalized educational reform network within which new educational ideas, trends, and fashions are being borrowed, copied, interconnected, harmonized, and hybridized across distant and local sites.[10]

"Centrifugal schooling" is the collective name used in this report for the prototypical curricula of the future emerging from these networks. The projects are each distinctive and innovative in their own unique ways, yet they share similar concerns, identify similar problems, and propose similar solutions.[11] Centrifugal schooling expresses a vision of the future of education and learning that is decentered, distributed, and dispersed rather than narrowly centered, channeled, and canalized. Its keywords are "networks," "connections," and "decentralization," as well as a family of related centrifugal terms. These keywords articulate a shift from a centered tradition of thinking about schooling, as an institutional process that happens on school premises through formal pedagogic techniques of transmission, to an emerging decentered vision where learning is centrifugally dispersed and cybernetically distributed into society through new technologies, communication networks, the informal pedagogies of media, and emerging social practices of interest-based, peer-to-peer, just-in-time participatory learning.[12] These ways of thinking about twenty-first-century learning are related to the general sense that social reality today is less securely anchored

or embedded in the traditional institutions that patterned social, cultural, and personal life in the past—namely, families, social classes, religious affiliations, lifelong vocations, and so forth. Instead, our social structures and institutions today are more scattered, fluid, disorganized, disembedded, diverse, mediated, risky, individualized, and confusing.[13] Networked communication technologies are fast becoming part of this mobile social environment. Internet users are no longer configured as the recipients of unidirectional flows of broadcast material generated from centers of media production but as multidirectional nodes in complex convergent communication circuits and network flows.[14]

Recast as a response to these technological changes, the kind of prototypical curriculum of the future associated with centrifugal models of schooling may be imagined as a more "open source" process rather than a fixed product, as embodied in the "wiki" format of open authorship, collective editing, and collaborative production. Crudely caricatured, the traditional centered curriculum was a curriculum based on a standardized mass-production model of "reading" that positioned teachers as broadcasters and learners as receivers, as embodied by school textbooks. In comparison, the decentered curriculum is a post-standardized, mass-customizable "read-and-write" curriculum that repositions teachers and learners as peer-to-peer producers, participative authors, and active creators of curriculum content, processes, and outcomes in a distributed meshwork of joined-up learning. A "wikiworld" of new learning encompasses a move away from seeing curriculum as a core canon or central body of content to seeing curriculum as hyperlinked with networked digital media, popular cultures, and everyday interactions.[15] Consequently, it is now becoming possible to conceive of the future of schooling

itself as a network-based distributed system of learning rather than a strictly routinized series of teaching tasks, though there is little evidence of the institutionalization of these methods.[16] That lack of evidence so far makes the research on the future of the curriculum for the digital age all the more significant. Furthermore, such styles of thinking about the future of learning are not all new and historically unique, as shown by the surprising continuities between politically conservative policies like A Nation at Risk, with its calls for a "Learning Society," and more recent advocates for "24/7 learning everywhere."[17] Centrifugal schooling is also continuous with a "connectivist" style of curriculum thought that was popularized in the 1990s, which today is being updated and projected into a hyper-connected "network" future. The changes embodied by centrifugal schooling are gradual, incremental, and cumulative, rather than representing an epochal break with the past.[18]

Researching Curriculum Networks

This research follows critical curriculum scholars in exploring two perspectives. First, from a critical theory perspective, it asks how the curriculum of the future may reflect the social power, interests, politics, and ideologies of particular groups in society. What different purposes and views of the future of society do they deploy, and how are these embedded in their curriculum concepts? Second, however, the analysis takes up a more "post-structuralist" view that social power does not emanate from a single dominant ideological source that produces the curriculum, but that the curriculum is produced within a complex web where power and influence are continually shifting and subject to continuous negotiation. The projects and programs under

scrutiny are not big-P policies or official curriculum reforms but little-p policy proposals and reforms-in-action. Consequently, the analysis looks beyond the power, ideology, and influence of the "usual suspects" of government departments and big commerce to trace the "micro-level actors" involved in the reimagining of the curriculum and the norms and values it embodies.[19]

In order to interrogate the curriculum of the future imagined by the prototype projects, this report will examine how curricula are created and distributed through *curriculum texts* and *curriculum networks*.[20]

Curriculum Texts

Curriculum texts are documents that introduce and explain curriculum ideas. They include curricular guidance, research reports, Web sites, resources, and materials provided by the various creators and sponsors of curriculum projects. These texts take ideas about alternative possible future directions for the school curriculum and translate them into proposals for programs and practices. Texts are a useful source of documentary evidence because they render complex ideas coherent and communicable, though for that reason they do need to be read with critical caution as selective representations rather than as empirical observations. All educational texts, as relays of styles of thought, create positions for teachers and children, managers, parents, policymakers, and so forth, providing them with a language, vocabulary, and a repertoire of practices with which to think and act. They make particular sets of ideas, language, vocabulary, and concepts obvious, commonsense, and seemingly true. What such a text analysis approach aims to uncover is the distinctive style of thought regarding the curriculum of the future that runs through these projects—its terms, concepts, references, relations, arguments,

and explanations, as well as associated practical techniques for curricular intervention. Texts such as those interrogated in this report are understood to exert and produce real effects, though the extent to which they actually produce what they envision remains a matter for further empirical research.[21]

Curriculum Networks

The research also traces something of the networks of relations between various actors involved in designing the curriculum of the future. The curriculum is understood as assembled and made up through interactions between agents and agencies of many kinds—individual people, parties, organizations, companies, networks, institutions, and so forth—as well as texts, technologies, and objects, rather than predetermined as a complete and coherent product or a black box constituted by a universally given body of knowledge or by predetermined purposes and aims. As a consequence, the approach in this report is to focus on curriculum texts as documentary constructions of reality that are constantly being circulated, moved on, and connected up to other actors and things. A curriculum is actively assembled, improvised, and "lashed up" from a messy and heterogeneous mix of people, groups, coalitions, organizations, institutional structures, each associated with different ideas, theories, and knowledge; political, intellectual, and historical associations; and a panoply of ongoing negotiations, decision making, and compromises. The production of a curriculum for the digital age is embedded in theories of learning and pedagogy, and assumptions about new technology and media that are all imbued with political, cultural, and economic values and objectives. The participation of such diverse players and elements introduces a variety of sources of authority and expertise into the

curriculum-making mix. These participants and elements join together as networks, sometimes fleetingly, sometimes for long enough to establish and maintain projects based on a coherent shared vision, occasionally with sufficient durability to achieve something like system-wide influence. Importantly, taking this view forces researchers to consider the ways in which the curriculum may be shaped by actors and forces acting on it "at a distance"—that is, not through direct manipulation or influence but through delicate connections from afar. A curriculum possesses, so to speak, a messy social life. It is the result of myriad local and distant attachments between people and their historical, conceptual, and political networks, and it is assembled according to specific negotiations and compromises concerning which knowledge and legacies from the past and which future visions of a society are to be included or excluded from it.[22]

The Case Studies

The curriculum R&D programs examined include the following:

Enquiring Minds (EM) was a curriculum R&D project carried out over a four-year period between 2005 and 2009 by the nonprofit organization Futurelab in the city of Bristol in the United Kingdom, with funding from Microsoft Partners in Learning. Initially, two schools participated in the trial, with students aged 11–13, though it was later disseminated widely. It aimed to produce an approach to curriculum based on a dynamic view of knowledge and "the challenges schools face in the task of preparing children for a future characterized by rapid social, technological and cultural change."[23]

High Tech High (HTH) was originally launched in 2000 as a single charter school by a coalition of San Diego business leaders.

Built around a project-based curriculum, HTH is intended to "integrate technical and academic education to prepare students for post-secondary education in both high-tech and liberal arts fields." It has since evolved into an integrated network of eleven public charter schools in San Diego County, a teacher certification program, and a new Graduate School of Education, with financial backing from the Amar Foundation, Simon Foundation, and the James Irvine Foundation.[24]

Learning Futures aims to support students to "work and thrive as the world grows more interconnected, the environment becomes less stable, and technology continues to alter relationships to information." Established in 2008 by the nonprofit Innovation Unit and the philanthropic Paul Hamlyn Foundation in London, Learning Futures has worked with forty schools to develop innovative changes to curricula, pedagogy, and assessment. In early 2012 it published a collaborative guide to project-based learning in partnership with High Tech High Graduate School of Education.[25]

New Basics was originally trialed in 2000–2004 in more than fifty schools in Queensland, Australia, with support from the state government department of education. It promoted "futures-oriented categories for organizing curriculum" and a way of "managing the enormous increase in information that is now available as a result of globalization and the rapid change in the economic, social and cultural dimensions of our existence."[26]

Opening Minds, initiated by the Royal Society for Arts, Manufactures and Commerce (RSA) in the United Kingdom as a "competence-based curriculum which aims to equip young people with the skills they will need for life and work in the knowledge-intensive and new media-rich 21st century." Initially trialed for three years (beginning in 1999) in a small cluster of British

secondary schools with students aged 11–14, by 2011 the competencies curriculum had extended to a network of 200 schools nationwide, established it own flagship school in Manchester, and become an independent charitable organization.[27]

Quest to Learn (Q2L) is a "school for digital kids" that opened in New York City in 2009. A collaboration between the nonprofit Play Institute and the education reform organization New Visions for Public Schools, the Q2L curriculum and pedagogy emphasize "design, collaboration, and systems thinking as key literacies of the 21st century."[28] A sister school was established in Chicago in 2011.[29] Both receive support and funding from the John T. and Catherine D. MacArthur Foundation.

In addition to these specific programs and schools, the report also looks at two major partnerships:

The Partnership for 21st Century Skills (P21), a national organization in the United States that advocates for "21st century readiness for every student." Its Web site states that: "As the United States continues to compete in a global economy that demands innovation, P21 and its members provide tools and resources to help the U.S. education system keep up by fusing the 3Rs and 4Cs (Critical thinking and problem solving, Communication, Collaboration, and Creativity, and Innovation)." P21 members include many high-tech multinational corporations.[30]

The *Whole Education* alliance in the United Kingdom represents a network of charitable, nonprofit, and other "third sector" educational organizations. Whole Education brings together education organizations that demonstrate "a commitment to developing a range of skills, qualities, and knowledge that young people will need for the future," providing a mix of "practical and theoretical learning," and thereby "recognize that learning takes places in various settings, not just the classroom."[31]