Edited by
Matteo Stocchetti

The Digital Age and Its Discontents

Critical Reflections in Education

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CHAPTER 1

Introduction

Technology, Society and Education

Matteo Stocchetti
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Introduction

The Digital Age and Its Discontents is a book project inspired by Sigmund Freud's reflection on the downsides of progress. Similarly to that influential work, this project is a study of the downsides of digitalization and the re-organization of the social world that seems to be associated with it—what we refer to as the 'digital age'. Unlike Freud's work, however, in this project, we reject the deterministic aspects of this re-organization and, more in line with critical social theory, we seek to conceive and construct alternative possibilities. In this effort, the role of education is fundamental. The starting point of this study is the critical theory of technology and the idea that (digital) technology is neither politically neutral nor 'characterized by a singular "essence of technology"' (Feenberg 2009: 146). Rather, it is a place of struggle: another arena, albeit a fundamental one, in which social forces compete for the control over the distribution of values in society. The general aim of this project is therefore critical in at least two senses of this notion. First, it seeks to bring to the attention of a broader public the arguments that, from a variety of disciplines, are voicing increasing concern about the nature and direction of the transformations

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supported by digitalization. Second, and in so doing, it seeks to contribute to the effort of drafting alternative possibilities by problematizing the role of formal education as the social activity most directly involved in the making of alternative futures.

The fundamental issue addressed in this collection is the ideological appropriation of technological development and, more precisely, the influence of capitalism on the relationship between social change, technological development and education. The purpose of this book is thus to argue for the importance of this issue, to describe its origins and implications in selected domains, to offer some intellectual tools (in the form of concepts, arguments, literature, etc.) and to engage with the issue, especially in formal education. There are at least three main tasks involved.

On analytical grounds, the main task is to examine the role of technological innovation in relation to the nature and direction of social change associated with different interpretations of this role, and in relation to the role of formal education. This role, in turn, is a complex one, as formal education is both a fundamental institution and a key arena or place of struggle between competing visions of the future of society and, consequently, of the role of technological development. The analytical challenge, in other words, is one of complexity and ambivalence, but also, in line with the critical traditions, one of normative commitment to emancipation and democracy.

On political grounds, and relatedly, one of the main tasks is to challenge mainstream or 'traditional' interpretations of the relationship between technological development, social change and education with 'critical' ones.[1] In traditional interpretations, technological development is an independent or 'natural' force that has an irresistible influence upon society, but is itself autonomous from the influence of social forces. Social change consists of mere adaptation, formal education is 'vocational' training in the productive use of new technologies and opposition to social change in the direction prescribed by new technologies is not only 'wrong', but also futile. Despite its factual inaccuracy, this interpretation performs crucial socio-political functions. In line with the myths of technology, it offers a promise of a better future in exchange for adaptation and compliance. Social change is selectively enforced as both necessary and restrained: we must be ready and prepared to update ourselves, our attitudes, our competences, our lifestyles, etc. for changes that are however confined within the range of possibilities compatible with the fundamental needs of capitalist social order, the concentration of capital and the legitimization of inequalities.

On educational and pedagogical grounds, a core task is thus to challenge these interpretations. Once this 'digital future' enters the curricula of formal education, the formulation of alternatives becomes difficult and, as the aphorism goes, 'it is easier to imagine the end of the world than to imagine the end of capitalism'.[2] Despite its rhetorics, capitalist technological development is far from 'revolutionary' and its effects on social changes and education strengthen,

rather than weaken, the grip of capitalist ideology on society. In this process, the role of education is to facilitate the social change brought about by technological development as this is appropriated by capitalism. Technology leads societal change, and the practices of formal education must adapt—themselves and younger generations—to live and participate in a project whose fundamental coordinates are unquestioned and whose alternatives are relegated to the harmless limbo of utopia.

In a critical perspective, technological development is not a natural but a social process: not autonomous from but very much dependent upon the interplay of forces and institutions in society. But if technological development is indeed a powerful force of social change, the role of education is to create the conditions for the selective endorsement (or rejection) of this power. In democratic societies, the role of education should thus be discussed keeping in mind the problem of the democratic control of technological innovation: its potential for subversive social change. Because of its role in the disambiguation of technological potential, the institution and practices of formal education are not immune from the influences it could effectively oppose. While influential forces seek to establish the idea that the practices of formal education should conform to technological change, here we support the view that education can challenge the capitalist appropriation of digital technology and, therefore, the nature and direction of change associated with it. It is because education can do this that the same ideological forces that control technological development are now seeking the control of education. The chapters in this book discuss specific aspects of this general issue in more detail.

This collection seeks to offer its readers at least three intellectual prerequisites for critical engagement. First, a preliminary interpretation and 'mapping' of digital discontent so far. Second, a conceptual 'toolbox' for the critical engagement with digitalization and its impact on society in support of critical reflection, communication and ultimately collective action. Finally, some elements to develop a vision of the role of education: of what could and should be done in education to address the concerns raised by the voices of discontent.

In this introductory chapter, I address one of the key questions to ask: Why have digital technologies failed to deliver the initial promise of emancipation? The preliminary answer or 'working hypothesis' is that new information and communication technologies failed to express their emancipative potential because, since the beginning, around the 1970s, this potential undermined the influence of social visions, institutions and interests imbricated in the preservation of capitalism. In other words, the information 'revolution' coincided with the crisis of capitalist democracy and the end of the historic alliance between these two ideologies.

In the section that follows, I present a short list of the contributions that since the 1970s to the present have voiced the discontent with the capitalist appropriation of technological development. Although incomplete and unsystematic, I hope this list will contribute to the argument of at least three main points.

First, the history of technological development of the past half a century or so is not a story of 'revolutions', if by this term one designates radical changes in the distribution of power. Quite the opposite: this is a story of the capitalist appropriation of technology and its affordances in support of not only capital accumulation, but also social control, against the challenges of democratization. Albeit incomplete, the chronological bibliography below shows that early criticisms of the information revolution were quite aware of these effects and explicitly pointed to the risks that, rather than emancipation, capitalist appropriation would result in a spiral of growing exploitation, surveillance and repression.

Second, the fact that capitalism appropriated new communication technology does not mean that this appropriation was uncontested. The problem, however, is that the resistance to capitalism is not always supportive of democracy. Within the critical tradition, but from different perspectives, Karl Polanyi and Erich Fromm have described how capitalism feeds totalitarianism in society, with the notions of 'double movement' and 'illusion of individuality' respectively. From the perspective of political economy, Polanyi argued that the disruptions associated with the penetration of the self-regulating market in society generate a defensive reaction and the rejection of freedom as this value is (mis)construed in capitalism within the narrow terms of economic freedom (Polanyi 2001 (1944): 266). From a psychoanalytic perspective, Fromm argued that the exercise of true individual freedom requires the fundamental sense of security that comes from being part of a community. However, the exercise of economic freedom in capitalism brings about isolation, powerlessness, alienation and the 'illusion of individuality' that creates fertile conditions in society for the rise of authoritarian leaders (Fromm 2003 (1942)). Applied to the effects of the capitalist appropriation of technology, these analyses help in understanding the reason why new communication technologies currently seem to pose more risks than opportunities for freedom and democracy.

Third and finally, the analysis of the history of discontent suggests that the notion of the post-digital may be a catalyser of both intellectual criticism and political activism, with roots in the early stage of the information revolution and 'post-industrial society'. Once again, the problem with this is that both democratic and non-democratic discontent about the capitalist appropriation of digital technology are seeking the opportunities to build radical alternatives to the present 'digital' condition in the conceptual space of the post-digital. The role of education is crucial to resist the capitalist and non-democratic appropriation of digital technologies, but also to establish the post-digital as a condition in which technological development can effectively serve emancipative purposes.

Digital Discontent: From the Crisis of Capitalist Democracy to the Dawn of the Post-Digital

As the traditional story would have it, the early roots of the 'digital age' are between the end of the 1960s and the early 1970s, with the information

revolution. This is a notion that, together with other notions such 'information society', 'post-industrial society', etc., was part of a discourse inspired by the idea of a radical change in the nature and direction of capitalist industrialization. What is usually forgotten is that the technological 'revolution' occurred during the crisis of capitalist democracy: a time in which *political* revolution was a dream to some and a nightmare to others.

In the conditions of the Cold War, the possibility or radical social change was perceived as a threat to the stability of the socio-economic order in Western societies. One of the most emblematic documents that testifies to the need of control associated with the development of new technologies was *The Crisis of Democracy: Report on the Governability of Democracies to the Trilateral Commission* (Crozier, Huntington & Watanuki 1975). In that report, its authors portrayed political participation as a hazard, warning about the effects of too much democracy on governability (ibid.: 161):

> The successful operation of democratic governments has given rise to tendencies which impede that functioning.
>
> - The pursuit of the democratic virtues of equality and individualism has led to the delegitimation of authority generally and the loss of trust in leadership.
> - The democratic expansion of political participation and involvement has created an 'overload' on government and the imbalanced expansion of governmental activities, exacerbating inflationary tendencies in the economy.
> - The political competition essential to democracy has intensified, leading to a disaggregation of interests and the decline and fragmentation of political parties.
> - The responsiveness of democratic government to the electorate and to social pressures encourages nationalistic parochialism in the way in which democratic societies conduct their foreign relations.

The crisis of capitalism, however, is a complex phenomenon that needs to be interpreted in relation to at least three dimensions: political, economic and epistemic. The salient feature of capitalism's political crisis was a set of occurrences (the crisis of welfare, the gap between democratic ideals and practices, the tension between the competing logics of the life worlds and the 'system', etc.) that Jürgen Habermas and Niklas Luhmann discussed in the terms of a crisis of legitimization (Habermas & Luhmann 1973 (1972); Habermas 1975 (1973)). The salient feature of capitalist economic crisis was the decline rate of profit associated with the crisis of the international economic system which, for example, according to Eagleton (2001: 4–5), generated Neoliberalism as a response. The core feature of capitalism's epistemic crisis consisted of the fundamental re-conceptualization of reality associated with the so-called 'constructionist revolution' which, stressing the importance of communicative

practices in the 'social construction of reality' (Berger & Luckmann 1966), supported in significant measure the hopes and fears associated with the possibility of radical social change (Stocchetti 2017: 407–408).

Thus, the crisis of capitalist democracy was fundamentally a crisis of sustainability for the ideological alliance between capitalism and democracy. As the development of early information and communication technologies (ICTs) occurred in the same period, it should come as no surprise, therefore, that the potential of these technologies was interpreted within the framework of this crisis. In mainstream reconstructions, information 'revolution' is de-politicized, the role of the ideologies and social forces involved in its origins and appropriation is hidden away, and the memory of struggles and alternatives is removed.

For those concerned about the democratic challenge to capitalist governability, however, these technologies implied serious risks for the preservation of a viable capitalist social order in the 'democratic West'. In this perspective, the information 'revolution' was more a putsch or 'golpe' as, in the conditions of the Cold War, the crisis of the alliance between capitalism and democracy was resolved by sacrificing democracy to preserve capitalism. The appropriation of new technologies simply contributed to the efforts in this direction.

In a somewhat paradoxical way, those concerned more about the fate of capitalism than about the crisis of democracy could learn about the repressive potential of new technologies from the interventions of scholars who sought to warn the broader public about these risks.

Already in 1954, French sociologist Jacques Ellul had warned that new technologies offered unprecedented opportunities for social control that were scarcely compatible with, if not antagonistic to, democratic governance (Ellul 1967 (1954)). In those early years, voices of discontent about the risks of the information revolution pointed to the need for moral reflections about its implications (Berkeley 1962), especially on personal privacy (Miller 1971). These early warnings involved also a broader critique of the role of these technologies in the advent of the 'post-industrial' society. This concept was influential in establishing the discursive context for the discussion of the social role of new technologies. While introducing a vision of the future or utopia, the concept of 'post-industrial society' contained strong normative implications that ultimately supported ideological functions the influence of which stretched to the present (Vogt 2016).[3]

The critics of those early days, however, were quite conscious of the nature of the dangers.

In 1976, for example, Abbe Mowshowitz warned about the risk of a 'virtual-' or 'neo-feudalism' associated with the appropriation of new technology, and especially artificial intelligence (AI), by the logic of the market and private company (Mowshowitz 1976; Mowshowitz 1984; Mowshowitz 2001; Mowshowitz 2002).[4]

Herbert I. Schiller was explicit about the capitalist appropriation of the information revolution in the 1980s, arguing that 'technology plays a vital role in the emerging new scheme of things, first to integrate the transnational corporate system and second to deepen the dependence of the peripheral world

on hardware, software, training, and administration supplied by that system' (Schiller 1980: 149). In a book published the following year, Schiller also criticized the enthusiasts of the information revolution and pointed to the corporate pressures in the United States, Western Europe and Japan to tackle decreasing returns on capital with new technologies (Schiller 1981).

In *The social significance of telematics: an essay on the information society* (1984), Lars Qvortrup anticipates many of the themes of and the reasons for scepticism that are still discussed today in relation to the impact of new technologies, for example, on democracy, control, social change and human development. In *The control revolution*, James R. Beniger argued that the transformations associated with the Industrial Revolution produced in the late 19th century a 'crisis of control' that inspired the 'revolution in social control' by the turn of the century (1986: 5). Also challenging the traditional narrative of technological 'revolution', David Lyon argued that 'it is hard to justify the claim that the information society takes us beyond industrial capitalism' (1986: 191). Even more explicitly, Brian Winston discussed 'the "law" of the suppression of radical potential' (1986: 23–24) to maintain that, as the development of communication technologies reflects relations of power that has remained fundamentally unchanged, '[t]he information revolution is an illusion, a rhetorical gambit, an expression of profound ignorance, a movement dedicated to purveying misunderstanding and disseminating disinformation' (ibid.: 363).

In the same year, and along similar lines, a collection of essays edited by Michael Traber (1986a) debunks the myth of the information revolution, arguing that new technologies have not supported citizen consultation, but served the interests of military, political and economic elites rather than those of democracy:

> For ten years and more we have been waiting for the information revolution to occur … Instead, there seems to be less and less participation in political decision-making … If anything, the communication revolution is turning out to be an exercise in consolidating the military, economic and political powers of the elite … most of which have their headquarters in the USA. Rapid collection and transmission of data made the global expansion for the transnational conglomerates possible in the first place. In that sense, it has changed global economy, global politics and global military strategy. (Traber 1986b: 1–3)

For Cees Hamenlink, 'what is termed "information revolution" could, in a more sober analysis, be seen as equally *non*-revolutionary as its predecessor, the industrial revolution' (1986: 8, emphasis in the original). The myth about the 'revolutionary' nature of the information society contributes to the capitalist appropriation of new technologies by hiding the true social impacts of this appropriation and, therefore, by thwarting opposition to it, since:

> The myth of the information society has a crucial normative implication in that it equates technical progress with a qualitative improvement to

> human life. This leap from quantitative growth to qualitative growth is used to sanction unrestrained technical development for the purpose of material expansion. (Hamenlink 1986: 12)

The influence of this myth, however, perpetuates capitalism in the economy and enforces centralization in politics and 'global synchronization' in culture. What this suggests ultimately is that the myth of the information society

> … is meant to cater to the interests of those who initiate and manage the 'information revolution': the most powerful sectors of society, its central administrative elites, the military establishment and global industrial corporations. But the myth does not hold promises for those who in today's society are the losers. In the information society they will simply be computer-controlled losers. (Hamenlink 1986: 13)

For Herbert I. Schiller, the information revolution shifts the balance of power from the state to the corporation and erodes national sovereignty to the advantage of the world business system. The state, however, will not be obsolete as long as 'it continues to supply one indispensable function to transnational capital: it serves to maintain order in the subject territories' (Schiller 1986: 31).

For Hamid Mowlana, the information revolution is an 'unfinished revolution' whose 'detrimental effects … has been well documented, analyzed, and accepted as a fait accompli by countless sociologists, anthropologists, and psychologists' (1986: 212). The question critical intellectuals should ask is how to reverse this trend (ibid.: 212–213).

In their critique of the ideological dimension of information technology, Jennifer Daryl Slack and Fred Fejes analysed the role of capitalism in relation to two notions of ideology as 'a fundamental part of social life' and 'a mechanism of repression and domination to be struggled against', respectively (Slack & Fejes 1987: 3). Criticizing the mainstream idea that, in the information age, 'information replaces industrial goods as the principal commodity and economic engine of the information age' (ibid.: 4), Slack and Fejes pointed out some of the main impacts of the ideological appropriation, such as:

> … the equation of the development of information technologies with social progress; the quantification, commodization, and privatization of information; the collapse of information, knowledge, and wisdom; the positioning of the information age as a whole new (and superior) way of life brought about by the new technologies; the positioning of the world as a market and as a source of labor and raw materials; an uncritical and overwhelming optimism/determinism about the future of political, economic, and social/cultural life and the role of information technologies in it; and the role of information and information technologies in the exercise of social power. (ibid.: 11)

In the same year, Tom Forester published a history of the information revolution and an early discussion of its detrimental effects on labour and privacy (1987). In 1989, while the world celebrated the fall of the Berlin Wall and the official end of the Cold War, Frank Webster and Kevin Robins argued that, in the West:

> The exploitation of information resources and technologies has expressed itself, politically and culturally, through the dual tendency towards social planning and management, on the one hand, and surveillance and control on the other. (Webster & Robins 1989: 277)

For Maijd Tehranian, the information revolution was associated with 'fundamental processes of depoliticization taking place in the economic, political and cultural spheres. All three processes find their common core in the rapid post-war penetration of a global capitalist economy throughout the world' (Tehranian 1990: 24). Against the background of this crisis:

> Information technologies are thus dramatizing the two stark tendencies in world development. On the one hand, they promise an era of higher productivity, direct democracy, and cultural diversity. But on the other, they threaten massive unemployment, totalitarian surveillance, cultural homogenization, and cognitive tyranny. (Tehranian 1990: 15)

Adopting 'a framework for a symbolic structuralist perspective on communication and social change' that combined the work of Jürgen Habermas and Michel Foucault (Tehranian 1990: 38), Tehranian promoted 'communitarian democracy' to re-appropriate new technologies against the threat posed by 'new totalitarian formations'. These formations 'rely heavily on further atomization of society through a further closing of the public sphere while extending the consumer society and its boundless channels of self-gratification' (Tehranian 1990: 241).

In the same year, and among the first scholars to problematize the impact of new technologies in education, Seymour Papert defined *technocentrism* in education as 'the fallacy of referring all questions to the technology'. The target of his criticism was the tendency to think of education from a point of view that privileges the role of technology in the curriculum or 'information-centered approach', rather than 'the development of the child and the child's active construction of an understanding of the world. We might call these *child-centered* or *developmental-centered* approaches to education' (Papert 1990).

The 'New World Order': from the information to the digital 'revolution'

In the decade that followed the end of the Cold War, two influential texts, Francis Fukuyama's *The end of history and the last man*, and Samuel P. Huntington's *The clash of civilizations and the remaking of the world order*, in 1992 and 1996 respectively, set the ideological coordinates of world politics. This was

the decade of US hegemony, of the 'humanitarian wars' and of the discursive recovery of the medieval notion of 'just war', but also of the acceleration of globalization and the strengthening of neoliberalism as 'strong discourse' inspired by the 'methodical destruction of collectives' (Bourdieu 1998). In this decade, critical interventions reflected the influences of post-structuralism (e.g. in Jacques Derrida's 'deconstruction' and Baudrillard's notion of 'simulation' (Baudrillard 1994)) which, in turn, spilled over in popular culture with the film *The Matrix* (Wachowski & Wachowski 1999).

In an essay that sought to 'deconstruct' the information era, for example, Sohail Inayatullah discussed new inequalities, arguing that:

> Cybertechnologies thus create not just rich and poor in terms of information, but a world of quick inattentive time and slow attentive time, one is committed to quick money and quick time, a world where that and information are far more important than knowledge and wisdom. (Inayatullah 1998: 216)

Referring to the work of Zia Sardar (1995), for Inayatullah, 'cyberspace is the darkside of the West', since:

> While cyberspace claims community, there is in fact none, it is anonymous. There is no responsibility towards others since there is no longer relationship—there are no authentic selves, all exist for immediate short term pleasure and not for larger task of working together towards a shared goal. People are because they struggle through project/missions together, not just because they exist in shared virtual worlds. (Inayatullah 1998: 217)

Robert McChesney argued that, in the United States, media in general and Internet in particular do not support democracy (1999). The same year, Daniel Schiller coined the notion of 'digital capitalism' (1999) to interpret the history of the Internet and the cyberspace as a history of the capitalist appropriation of these technologies. Anticipating the later debate on 'echo-chambers' and 'filter bubbles', for example, Daniel Schiller argued that:

> Knowledge carried through the Internet is no less shaped by social forces than it is elsewhere. Far from delivering us into a high-tech Eden, in fact, cyberspace itself is being rapidly colonized by the familiar workings of the market system … Indeed, the Internet comprises nothing less than the central production and control apparatus of an increasingly supranational market system. (1999: xiv)

What is unprecedented for Schiller is not the emancipative potential of new technology, but rather the fact that 'for the first time since its emergence in the early twentieth century, the corporate-led market system no longer confronts

a significant socialist adversary anywhere on the planet' (Schiller 1999: 205). Enhancing the power of 'capital' against 'labour', globally and locally, new technologies affect societies with disruptive effects:

> As permissive technologies that are built to facilitate centralized control over far-flung corporate operations, networks permit transnational companies to elevate footloose profit hunger into what they seek to dignify with the term globalization. The result is to pit individual localities, states, and entire nations against one another in a competition to attract capital investment, and this rivalry predictably produces a 'race to the bottom.' Attaching conditions to continued or contemplated investments, companies demand lower corporate taxes, loosened environmental protections, diminished health and safety measures, and attenuated collective bargaining rights. The decline in the social wage, in other words, and the redistribution of wealth that it has spurred are essentially functions of the neoliberal project that makes networks its centerpiece. (Schiller 1999: 208)

One of the most systematic and radical approaches to the analysis of the relationship between technological development and social change of that decade is the critical theory of technology by North American philosopher Andrew Feenberg (1991; Feenberg 1992; Feenberg 1996; Feenberg 1999; Hickman 2006; Friesen 2012). Based on a tradition that includes the works of Karl Marx, John Dewey, Martin Heidegger and Herbert Marcuse, a core tenet of the critical theory of technology is that:

> … technologies are not separate from society but are adapted to specific social and political systems. Technologies are thus not neutral tools, because they are implicated in the socio-political order they serve and contribute to shaping, nor can they be characterized by a singular 'essence of technology' because they evolve historically along with other aspects of society. Just as institutions, laws and customs can be changed by human action, so can technological systems. The substantivist idea of the 'autonomy' of technology describes at most certain large-scale technical systems. (Feenberg 2009: 146)

The Table 1.1. shows the position of the critical theory in relation to the main theoretical traditions in the study of technology, as this position is discussed by Feenberg's approach.

The importance of this approach is analytical and normative: it is a tool that allows the understanding of the complex relationship between technological development, social change and ideology. But it is also a tool at the disposal of those who seek to promote emancipative change and the re-appropriation of technological development. As Feenberg argued:

Table 1.1: A typology of the main approaches to technology

Technology is considered	Autonomous	Human controlled
Neutral (technological means and ends are completely separated)	Determinism Technology is autonomous from social forces and neutral in relation to values	Instrumentalism Technology is dependent on human goals and has no independent effects on its own
Value-laden (technological means and ends are interconnected, constituting a 'way of life')	Substantivism Technology has social effects independent from human control	Critical theory Technology has effects reflecting the dominant social structures (ideology or value-systems)

Source: Author, based on Feenberg (2009, Table 24.1).

> It is possible that, in the future, those who today are subordinated to technology's rhythms and demands will be able to control it and to determine its evolution. I call the process of creating such a society 'subversive rationalization' because it requires technological advances that can only be made in opposition to the dominant hegemony (Feenberg 1992: 301).

At the turn of the millennium, *Empire* by Antonio Negri and Michael Hardt offered an influential post-Marxist interpretation of the global world order in which the 'repressive use of technology, including the automation and computerization of production, was a central weapon' (Hardt & Negri 2000: 267) to the establishment of the disciplinary regime of the Empire worldwide.

The beginning of the War on Terror and the popularization of generational distinctions in terms of 'digital natives' and 'digital immigrants' were occurrences that, although very different in kind, contributed to create an intellectual climate prone to see radical discontinuities and to neglect fundamental continuities.

The War on Terror inspired and justified the appropriation of digital technology as a tool for mass surveillance, control and discrimination, rather than freedom of communication and emancipation (Lyon 1994; Lyon 2001; Lyon 2003). Around the same time, the relationship between digital media and democracy started to be the focus of a growing critical interest (Hague & Brian 1999; van Dijk & Hacker 2000; Wilhelm 2000; Dahlberg 2001; Dean 2002; Dahlberg & Siapera 2007), which sought to re-appropriate the democratic potential of digital media (Dahlberg 2007; Boler 2008; Dean 2009; Hindman 2009).

Another influential feature of those years was the discursive construction of a technology based 'generational gap' and the introduction of the conceptual distinction between digital 'natives' and digital 'immigrants'. Originally introduced by Canadian business executive Don Tapscott (1998) and popularized by

US teacher Marc Prensky (2001), this distinction is based on the idea that digital technology introduces important change that affects the way in which new generations grow up and, most importantly, the way in which new, 'digital' generations learn. A corollary of this generational and epistemological 'rupture' is the obsolescence of pre-digital generations, knowledge and epistemologies. This distinction somehow recovers the 'revolutionary' connotation of technological development by seeking to subvert traditional relations of power between older and younger generations, on the one hand, and between supposedly digitally competent students and digitally incompetent teachers.

The introduction of this binary and the interpretation of generational differences in terms of technological competence sought to co-opt younger generations into the digital myths as these are appropriated by the neoliberal project and, at the same time, to delegitimize as 'obsolete' the influence of positions that resisted this appropriation and the project behind it. In this 'revolutionary' vision, teachers and practices that would not comply with the changes dictated by the digital future would be doomed to extinction.

Despite the fact that subsequent studies have found no grounds for this conceptualization of the digital gap between generations, ultimately discrediting the ideas associated with it (Helsper & Eynon 2010; Ståhl 2017), the alleged innate competences of digital natives were, and to a certain extent still are, providing the grounds for arguments for the digitalization and privatization of formal education. Associated with this argument is the idea that formal education should adapt to the neoliberal vision of our digital future, ultimately preparing younger generations to implement forms of social change compatible with the neoliberal project.

The conceptualization of generational differences in terms of competence and approach to digital technology reflected the ideological appropriation of digital technology and the myths associated with it. For Vincent Mosco, for example:

> The denial of history is central to understanding myth as depoliticized speech because to deny history is to remove from discussion active human agency, the constraints of social structure, and the real world of politics. According to myth, the Information Age transcends politics because it makes power available to everyone and in great abundance. The defining characteristic of politics, the struggle over the scarce resource of power, is eliminated. In this respect, myths create a new history, a new time, by denying history. (Mosco 2004: 35)

The notion of 'network society' appeared in numerous critical contributions on the impact of digital technology on the media and politics (Hassan 2004) on social experience of time.

Discussing the 'time of the network', Robert Hassan, for example, identifies the conditions 'to break the nexus between neoliberal globalization and the ICT revolution'. To break this nexus is necessary 'to begin to control the spread

and the comprehensiveness of network time in people's lives' so to 'allow ICTs to work in the service of humanity as opposed to the narrow interests of business' (Hassan 2003: 239). If this nexus is not broken,

> [w]e will rapidly become accustomed to living in a constant present and our understanding of who we are will emerge through the context of the knowledges that are produced within it. Ultimately, capitalism (or this current version of it) will be thought of as the only possible mode of organizing economic life (has it not already?), and critical thinking, other ways of being and seeing and other temporalities of experience will become, literally, unthinkable. (Hassan 2003: 239)

Adding an important analytical dimension to the earlier work of Hardt and Negri, Hassan argued that the speed enforced by the time of the network is crucial to understand the dynamic of the Empire and the way in which 'democracy succumbs to the economy' (Hassan 2009: 8).

For Manuel Castells, in the network society 'relationship to time is defined by the use of ICTs in a relentless effort to annihilate time by negating sequencing' and 'by blurring the sequence of social practices, including past, present, and future in a random order, like in the electronic hypertext of Web 2.0, or the blurring of life-cycle patterns in both work and parenting' (Castells 2009: 35).

In the same decade, other contributions focused on the influence of digitalization on politics, knowledge and the social construction of the self. Colin Lankshear and Michel Knobel coined the notion of 'digital epistemology' to discuss how digitalization changes the experience and construction of knowledge and how these changes influence education (Lankshear, Peters & Knobel 2001; Lankshear 2003; Lankshear & Knobel 2003). Another important concept in this direction is that of 'cognitive capitalism' used to describe the role of knowledge in the capitalist creation and appropriation of value (Peters & Bulut 2011).

In 2009, Amy Wendling published a study based on the long-lost Marx notebooks on the history of technology, thus offering new inspiration to the critical studies of technology in the Marxist tradition (Wendling 2009; Fuchs 2014a; Fisher & Fuchs 2015; Fuchs 2016; Fuchs & Mosco 2016).

In the meantime, other significant occurrences, such as a new global financial crisis in 2007, the revelations about global surveillance programmes run by the United States, the Five Eyes Alliance and other US allies by former intelligence analyst Edward Snowden, contributed to bring broader public attention to the detrimental effects of the capitalist appropriation of digital technology.

Jaron Lanier, one of the fathers of virtual reality, has influentially criticized the Web 2.0, the capitalist appropriation of the web and the distortion of its emancipative potential (Lanier 2006; Lanier 2010; Lanier 2013; Lanier 2018).

This discontent presumably contributed to the institutionalization of the critical tradition in the academia and inspired publications designed to offer also to undergraduate students an accessible account of this tradition (Kroker 2008;

Fuchs 2011; Kroker & Kroker 2013), but also the conceptual tools to interpret the challenges associated with the social media and the problem of surveillance (Fuchs 2012; Fuchs 2014b).

In research, the events of the 2010s invited more attention to the relation between digital technology, media and democracy. Lincoln Dahlberg looked at a new form of libertarianism in the digital age, or 'cyber-libertarianism' (2010), and proposed a map of the 'four positions' implied in the notion of digital democracy (2011). Zizi Papacharissi discussed the effects of the erosion of the distinction between the public and the private sphere on democracy (2010). In other studies of this period, the attention has been on the implications associated with the digitalization of new media (Fenton 2010) and with the possibility of re-appropriating the democratic affordances of the 'digital turn' by directing research on the actual political practices involving the state, the social media and radical movements (Trottier & Fuchs 2015; Fenton 2016).

The 'digital turn' in education was also the target of criticism. Neil Selwyn showed how the digital turn in education was inspired mostly by economic rather than educational interests (Selwyn 1999) and how initiatives such as the National Grid for Learning (NGfL) have implications for power and control that are neglected in mainstream debates (Selwyn 2000). Karen Ferneding discussed the detrimental effects of the discursive appropriation of educational technology by neoliberalism and the opportunities of framing the same technology in alternative discourses (Ferneding 2003). As the digital turn in education produced its effects, later contributions have offered increasingly disenchanted and even radical accounts of these effects, but have also argued for a more urgent attention to the future of educational technology and the possibility of re-appropriation (Kritt & Winegar 2007; Selwyn 2011; Selwyn 2014). Towards the end of the second decade of this century, this possibility is what gives the notion of the 'post-digital' a special appeal in both analytical and normative terms.

The crisis of digital capitalism and the dawn of the post-digital age

By the second decade of the 21st century, the capitalist digitalization has been the target of an extensive critique.

James Curran, Natalie Fenton and Des Freedman argued that the Internet failed to deliver its promises:

> The internet did not promote global understanding in the way that had been anticipated because the internet came to reflect the inequalities, linguistic division, conflicting values and interests of the real world. The internet did not spread and rejuvenate democracy in the way that had been promised, partly because authoritarian regimes usually found ways of controlling the internet, but also because alienation from the political process limited the internet's emancipatory potential. The internet did not transform the economy partly because the underlying dynamics

> of unequal competition that make corporate concentration remained unchanged. Lastly, the internet did not inaugurate a renaissance of journalism; on the contrary, it enabled leading news brands to extend their ascendancy across technologies, while inducing a decline of quality not offset, so far, by new forms of journalism. (Curran, Fenton & Freedman 2012: 179)

These predictions failed because the impact of Internet depends not only on its technology, but also on its political economy or 'the way it is funded and organized … designed, imagined and used … regulated and controlled' (ibid.: 179).

Robert McChesney argued that not only has capitalism appropriated the affordances of the Internet, but that it has turned them against democracy (2013). McChesney criticized both 'celebrants and skeptics' for not appreciating enough 'the way capitalism defines our times and set the terms for understanding not only the Internet, but most everything else of a social nature, including politics, in our society' (ibid.: 13).

In other critical contributions, the effects of capitalist digitalization are discussed in relation to the Foucauldian notion of 'biopower', or 'the set of mechanisms through which the basic biological features of the human species became the object of a political strategy, of a general strategy of power' (Foucault 2009: 1). The notions of 'biotechnology' (Cooper 2008; Rajan 2012), 'biocapitalism' (Peters & Venkatesan 2010) and 'bio-informational capitalism' (Peters 2012) share the idea that the capitalist appropriation of digital technologies opens up unprecedented forms of exploitations that do not stop at the human body or human species, but involve life itself. Bio-informational capitalism, in particular, is identified as an 'emerging pattern of ownership and political economy of new life' that can 'provide a new platform for a computational science of life that represents a new moment in the privatization and monopolization of knowledge' (Peters 2012: 109).

In the period in question, there is a growing attention to the possibilities of challenging the capitalist appropriation of digital technology. Todd Wolfson, for example, introduces the concept of 'cyber-left' to look at the 'strengths and weaknesses of digital activism and the logic of informational capitalism that underlies it' (2014: 8). Among his conclusions is the important idea that, in the conditions of 'communicative capitalism' (Dean 2009), the communicative strategy known as 'horizontalism' or 'the prioritization of horizontal forms plays in the hands of those in power' (Wolfson 2014: 193).

In *Critical theory and the digital* (2014a), David Berry addressed the ambivalence of digital technologies through the conceptual tools of critical theory. In the process, he re-actualized critical theory and sought to challenge the capitalist appropriation of these technologies by re-opening the emancipative opportunities associated with them.

Thomas Allmer applied critical theory to the analysis of the social role of digital and social media to conclude that the emancipative potential of these media is problematic. As 'tools for exerting power, domination, and

counter-power', new media participates in the struggle between the opposite logics of the commons and the capital, or emancipation and commodification (Allmer 2015: 177).

Discussing the capitalist appropriation of the participatory culture associated with the early history of the web, Lincoln Dahlberg argued that:

> … the story of the so-called non-participatory 'Web 1.0' functions not only to help constitute 'Web 2.0' and to highlight the participatory qualities of the associated applications and practices currently named social media but also to obscure a participatory computer network-based culture that was in fact thriving at the time (within a small, but rapidly growing, section of the global population). (2015b: 1)

Adopting the approach of a critical political economy, Dahlberg also discussed the new inequalities associated with the private ownership of social media platforms by a few for-profit corporations (2015a).

In the same decade, the failed promise of digitalization became apparent also in formal education. In 2015, a report by the OECD undermined the enthusiasm for the digital turn in education. Results from extensive research pointed out that 'the reality in our schools lags considerably behind the promise of technology', 'technology is of little help in bridging the skills divide between advantaged and disadvantaged students' and 'conceptual understanding and higher-order thinking requires intensive teacher–student interactions, and technology sometimes distracts from this valuable human engagement' (OECD 2015: 3).

Debunking the myth of individual emancipation, Rob Cover, for example, argued that digital technology in formal and informal education is influential in the formation of the self of younger generations in ways compatible with consumerism and other features associated with capitalism/neoliberalism (2016).

By the end of this decade, the concerns associated with the social, political and economic implications of digitalization (e.g. the Cambridge Analytica affair) should invite renewed attention to the warnings of Polanyi and Fromm about the disruptive effects of capitalism. In the digital age, the double movement may consist of a circular relation between surveillance, disinformation and more surveillance. While new revelations and court proceedings unveil the actual magnitude of corporate surveillance and its imbrication with state surveillance, even in allegedly democratic regimes, concerns about disinformation and fake news are mobilized to incite support for more or less veiled forms of control and censorship.

Almost half a century after the 'crisis of democracy' decried by the Report of the Trilateral Commission, the need to protect democracy is once again an argument actually used to hide the effects of the capitalism on information itself. In a remarkable expression of dissent against mainstream narratives, Jonathan P. Marshall has argued that the crisis of truth so often lamented is brought about primarily not by the communicative behaviour of ideologies or movements hostile to democracy, but by the 'disinformation society' brought

about by information capitalism (Marshall 2017). While disinformation is common in human communication, capitalism exacerbates this condition by transforming information from a common good into a strategic resource. Information, in other words, becomes a weapon for the competition of power in which 'misdirecting others with inaccurate information, increases the benefit of any accurate information possessed' and 'advertising (or producing a front) becomes the model for communication' (Marshall 2017: 13–14). The idea that democracy needs objective information and certified truths is based on the confusion between the meaning of 'information' in social and computer systems, and promotes the circulation of information as is required by the regime of post-politics: the regime in which societies are ruled like administrators 'rule' computer networks. Thus, by making artificial boundaries, commodifying information, disrupting accurate information flow, building hierarchies, issuing strategic business enhancing information and focusing on price, capitalism becomes embedded in disinformation (Marshall 2017: 15).

Almost 40 years after the crisis of capitalist democracy and the beginning of the information 'revolution', democracy seems still threatened by too much freedom, by too much financial instability and by the challenges to the neoliberal truths brought about by the dramatic increase in the communicative freedom associated with new technologies. The problem is that too many of these challenges are inspired by undemocratic ideals. As Polanyi and Fromm had understood, societal response to the neoliberal disruptions are often undemocratic in kind: new forms of populism animated by the insecurities and injustices associated with the global spread of the self-regulating market. The question is, then, how to oppose the capitalist appropriation of technological development *and* the undemocratic effects of discontent?

Social psychologist Shoshana Zuboff, has popularised the term 'surveillance capitalism' to describe a stage of capitalism in which the economic imperative of reproduction of the capital and the socio-political practices of control and surveillance combine and, in practice, surveillance is productive. This 'mode of production' is a mortal threat for the institutions of democratic societies and for Zuboff: 'We need to intervene in the specific mechanisms that produce surveillance profits and in so doing reassert the primacy of the liberal order in the twenty-first century capitalist project' (Zuboff 2016: 8).

Another useful concept to begin answering this question is 'postdigital'.

Discussing postdigital humanities, David Berry, for example, argued that the postdigital humanities is 'a digital humanities that includes cultural critique' necessary to address 'issues of power, domination, myth, and exploitation' associated with the post-digital age (2014b: 26).

In an effort to re-think education away from the capitalist appropriation of new technologies, but also from the capitalist appropriation of education or the 'neoliberal university', Michael A. Peters and Petar Jandrić have discussed and drafted the fundamental features of the university in the age of digital reason, openness and collaboration (Peters & Jandrić 2018).

Vivien Hodgson and David McConnell have argued that the theory and practices of networked learning and teaching are based on the critical pedagogy of Paulo Freire, making this approach a most suitable one for the challenges of the post-digital world (Hodgson & McConnell 2019).

Sarah Hayes has argued in support of 'postdigital possibilities, where technology is approached *critically* by a larger open community of authors than ever before' (Hayes 2019: 5, emphasis in the original).

Noting that 'the postdigital no longer opposes the virtual or cyber world to the world of face-to-face', Andrew Feenberg argued that '"blended education" seems a good model of post-digitalization' as 'students access readings, images, and videos on the network while still meeting in class to listen and discuss' (Feenberg 2019: 8).

The debate about the post-digital age has just started and the semantic area of the concept itself is far from established. For our purposes, however, this concept seems promising for at least two reasons. First, it describes the condition of incredulity with the myths of the digital 'revolution' in a similar fashion as, for example, for Jean-Françoise Lyotard the postmodern condition describes the incredulity with the metanarratives of modernity. Second, it is also the conceptual space or condition where it is possible to conceive and engage with different ways of relating to technological development, social change and education. The fact that in this conceptual space utopian and dystopian futures coexist constitutes the reason to engage with this notion: the frightening possibilities it implies, but also with its great opportunities.

Contents of the volume

The review above is far from exhaustive, but is perhaps enough to convince the reader that the roots of digital discontent are deep and wide, reaching all the way to the beginning of the information revolution in the 1970s and extending to all its ramifications and dimensions.

With this background in mind, the reader will be better informed to appreciate the elements of continuity and discontinuity, what is 'old' and what is 'new' in the critical intellectuals' debate about the effects of technological development in capitalist societies.

In the remainder of the book, the focus is therefore on more specific issues and causes for concern.

In Chapter 2, Marko Ampuja continues the discussion about the appropriation of the digital age by capitalist ideology and the destructive effects of this appropriation, focusing on the fetishist character of 'digital innovation'. Inspired by the Schumpeterian notion of 'creative destruction', Ampuja discusses the implications of this fetishism in terms of 'destructive creation' in the relationship between technology, the state and the corporation. Ampuja uses and extends the critique of the economist Mariana Mazzucato to describe the

risks of innovation fetishism for democracy and argues for a politicization of the role of the 'entrepreneurial state' in the direction of digital innovation.

Amy Wendling, in Chapter 3, applies a conceptual framework based on Marx, Freire and Marcuse to discuss the role of the screen in education and its implications in relation to the twin notions of freedom and unfreedom. Starting from the critical idea that 'the concepts of "human" and "technology co-evolve"' and each is imbricated in the development of the other, Wendling suggests that, despite its potential for unfreedom, 'the screen can stabilize more than one kind of political form'. The preliminary answer is a positive one. In line with the Freirean idea that 'revolution is pedagogical', Wendling endorses a critical interpretation of formal education in which 'the classroom is a designated forum for practising dialogical action'. Her recommendations are practical and explicit: 'Rather than banish the screen from the classroom, I suggest that we invite the screen in, in order to see what its capabilities are, and also to reveal its limitations.'

In a most timely contribution, Lincoln Dahlberg problematizes in Chapter 4 the role of social media, and in particular Facebook as the most influential among them, in the constitution of a digital equivalent of the 'public sphere' that, according to Jürgen Habermas, is so fundamental for the preservation of democratic politics. Relying on a wealth of sources, and from the normative standpoint of critical social theory, Dahlberg addresses four fundamental questions. First, 'how has Facebook responded … to its quality problems vis-à-vis quality public sphere communication?' Second, 'how precisely does Facebook's revenue model negatively impact the quality of communication as judged by public sphere norms?' Third, 'how do Facebook's quality initiatives attend to, if at all, this negative impact?' Fourth, 'what should be done in education to address Facebook's impoverishment of online public sphere communication via its targeted-advertising revenue model, and what should be education's response to the ideological masking by Facebook's initiatives of this impoverishment?'

Chapters 5 and 6 by Laurence Barry and Eran Fisher, respectively, discuss the impact of digitalization on the self. Barry applies Foucault's notion of power to the analysis of the 'quantified self' and its disciplinary implications to make a strong argument against the ideology and the goals of the Quantified Self movement. The reliance on algorithms for the construction of knowledge about the self 'discards the rational individual as an object of knowledge' and replaces it by 'impulses and emotions that can be turned into further dependence and addiction'. In his chapter, Fisher follows up in this line of enquiry and invites the reader to reflect on the (im)possibility of developing a critical knowledge of the self within a communicative environment increasingly based on algorithms and its political consequences. Through a text that is exemplar in making accessible difficult topics and arguments to the less experienced reader, Fisher discusses the algorithmic and psychoanalytic epistemes of the self (or ways of organizing available knowledge about the concept of the self)

in relation to their impact on the nature of the self that may result from each. Fisher's conclusion is that the 'algorithmic self' is a 'post-political identity' and, as such, a challenge to the idea that the efforts to seek emancipation can be based on the centrality of the individual as a political subject.

In Chapter 7, Richard Hall shifts the focus more directly to education. Hall explores the impact of digitalization on the university and on the relations of power between managers, academics and students, addressing the question if and how the resulting 'platform discontent' can generate alternative usage of new technologies. Adopting a conceptual framework that relies on the work of Karl Marx on technology, Hall addresses the question of 'whether the educational technology and workload management platforms that are used to control academic production might act as sites of discontent and alternatives' to 'imagine that another university is possible'.

Moving from the institutional to the pedagogical dimension, Norm Friesen discusses in Chapter 8 the technological imaginary in education, and presents the grounds to reject the myths and utopias afflicting technological development in education. In a chapter that will delight the reader with an interest in the history of pedagogy, Friesen argues that the introduction of the computer in education has been supported by the influence of the idea of 'educational dialogue' and 'personalized learning' in the history of education. In the imaginary of education technology, however, this ideal of dialogue has been adopted as a metaphor and has ultimately become a myth. A myth, Friesen adds, that 'is used not to explain a belief or natural phenomenon, but to justify efforts in the ongoing reform and development in education' (p. 155).

In Chapter 9, Petar Jandrić and Sarah Hayes look at educational discontent with technological unemployment, and offer a preliminary map of the discontent there. Their chapter contains at least three important points. First, they identify and describe 'six main areas of discontent: discontent with neoliberalization, discontent with automation, discontent with dehumanization, discontent with acceleration, discontent with content of work, and discontent with educationalization'. Second, based on this mapping, and the Heideggerian idea that 'the essence of technology is by no means anything technological', Jandrić and Hayes present their case for 'discontent as an agent of change' and the notions of 'post-digital' and 'post-digital discontent' as preliminary conceptual tools to support the reflection about the nature and direction of this change. Third, the authors argue that an influential part of this change consists of acknowledging that the relation between education and technological unemployment is dialectical as 'whilst educational systems do prepare students for the marketplace, they also contribute to the creation of a (new kind of) market place'.

In Chapter 10, 'Pedagogic Fixation', Christo Sims reveals how these myths affect managers and decision-makers in education, resulting in distortions that ultimately magnify the influence of capitalist ideology, disregard the shortcomings of practices inspired by it and undermine critical attempts to counter its detrimental effects.

Danielle Shanley, Tsjalling Swierstra and Sally Wyatt provide in Chapter 11 an argument for the critical use of digital technology to promote the humanistic values conventionally associated with the pedagogy of self-development and dialogue with society usually referred to as *Bildung*, in 'massive open online courses' or MOOCs. In their chapter, the authors present the grounds for the argument of the 'enthusiasts' and the 'sceptics', systematically addressing the arguments of each and the concerns expressed on economic, political and pedagogical grounds. As they eventually suggest, rather than considering MOOCs a 'revolutionary force' in education, they 'could be embraced as a way of fostering a quieter, slower form of disruption'. The recommendations for students, designers, policymakers and teachers is 'to adopt a more nuanced understanding of digital or virtual spaces for teaching and learning that recognise' the inherent 'potential for fruitful engagement and intervention'.

In the final chapter of this collection, Afterword, Michael A. Peters introduces the reader to a new and very promising intellectual approach, or 'paradigm', to technological development and its discontent. The main argument here is that 'nanotechnology, biotechnology, information technology and new technologies based on cognitive science' constitute a 'convergence' that may set the conditions for a 'new renaissance in science and technology', but which, at the same time, also pose formidable challenges to the cognitive and affective foundations of our very humanity.

As a concluding remark, I would like to add that I am aware, and the reader should be too, that the debate about the digital discontents is ongoing and one continuously revived by news about micro and macro detrimental effects of available technology in our lives. This collection, therefore, is not meant to be a conclusive statement, but rather a provisional assessment of an evolving process and, perhaps more ambitiously, a 'toolbox' for educators and for further research. If the effort in this direction has succeeded, it is up to the reader to decide.

Notes

[1] For the reader with an interest in this distinction, Max Horkheimer (1982) called 'traditional theory' the approach to knowledge that does not problematize the moral grounds of an existing social order nor the possibility of a radical change, but is rather motivated by the need of knowledge necessary to support the vital functions of this social order. Conversely, critical knowledge is the approach to knowledge that not only problematizes the legitimacy of a given social order, but also seeks to achieve and disseminate the knowledge necessary to change it in a more emancipative direction.

[2] Fredric Jameson used this aphorism in the article 'Future City' (2003).

[3] According to Vogt (2016: 369), this notion appeared for the first time in the sociological classic *The lonely crowd* (Riesman, Glazer & Denney 1950) to

describe the condition of post-war Western societies in which people are 'other directed' rather than 'tradition-' or 'inner-directed'. While in other accounts the origins of the concept are attributed to French sociologist Alain Touraine (1971), there seems to be little uncertainty that it was North American sociologist Daniel Bell (1974) who popularized its usage.

[4] For another early contribution on AI, see the collection edited by Robert Trappl, *Impacts of artificial intelligence: Scientific, technological, military, economic, societal, cultural, and political* (1986).

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CHAPTER 2

The Blind Spots of Digital Innovation Fetishism

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Introduction

Innovation is a central keyword of economic policy planning in advanced capitalist countries. Above all, it signifies a call to reform all economic branches and social institutions in ways that make them more supportive of national competitiveness. Accordingly, universities are today not only sites for the study of innovation, but they are also increasingly imagined as business-oriented innovation powerhouses, especially by industry lobbies that find universities lacking in entrepreneurial vigour. Legions of educational and business publishers have answered these calls by churning out books and guides that aim to enhance innovation activities in private companies and public institutions. Adding to the same trend, the business press and the media in general frequently publicize stories on firms and entrepreneurs that are considered model innovators. As a result of these combined ideological efforts, public discussions and the media are today filled with calls to transform state institutions, labour markets, education and even basic cultural values so that these would better

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serve the spirit of innovation, upon which not only the health of the economy but whole societies is seen to depend.

Due to the phenomenal growth of innovation rhetoric, it is no wonder that the concept has recently aroused critical interest. Paul A. David, professor emeritus of economics at Stanford University (2012: 510), writes of 'the innovation fetish': an 'excessive fixation upon innovation' among the economic, political and educational elites, who have endowed it 'with seemingly magical or spiritual powers associated with animistic or shamanistic rituals'. Pointing to similar aspects, Valaskivi (2012) writes of the rise of 'innovationism', a quasi-religious discourse focusing on innovation that is carried forward especially by social media gurus, information and communication technology (ICT) company leaders, management consultants and researchers working in think tanks and business schools. It promotes the entrepreneurial values of individualism, inspiration, risk-taking and competitiveness, and attaches these to the key symbols of innovation, such as successful start-up companies and Silicon Valley. The latter has served as the 'spiritual' centre of innovation enthusiasm, while ICT entrepreneurs have been singled out as public role models that, together with new ICT and digital innovations, represent capitalist dynamism. These discourses form the core of contemporary digital innovation fetishism.

But why call such discourses fetishistic? In traditional anthropological terms, a fetish refers to a religious object that is assumed to possess supernatural powers. Yet, the Durkheimian conclusion that innovation discourses offer 'an accepted, self-evident, future-oriented—and collective—way of imagining a better future' (Valaskivi 2012: 150) is not sufficient by itself. It registers a 'religious' dimension of innovation discourses—a means by which a collective may symbolically worship itself—but leaves out their ideological nature and how this effort takes place under the specific social relations determined by capitalist commodity production. Leading innovation discourses and practices have different effects for different groups of people, depending on their material and cultural capacities. The appeals to innovation and creativity may thus be empowering for the so-called high-net-worth individuals who invest in start-up companies, or for the motivational speakers who cash in on those appeals on the business speaking circuit. However, they are much less empowering and more discouraging for low-paid workers who work long hours for those companies or in the gigantic warehouses of digital platform capitalism.

For Karl Marx, the essence of fetishism was that, in the capitalist mode of production, the relationships between workers and capitalists take on the form of social relationships between things. He argued that the implications of this could only be understood if 'we take flight into the misty realm of religion' where 'the products of the human brain appear as autonomous figures endowed with a life of their own' (Marx 1990: 165). In capitalism, the workers are forced to sell their labour power to the capitalists, who use it to produce commodities for the market. Because the workers do not decide what is produced, for whom or why, what they labour for will in the end only serve the process of

capital accumulation. This is so both in terms of the manufacturing of articles of consumption and the manufacturing of means of production, including the innovative 'results from science, inventions, divisions and combinations of labour [and] improved means of communication' (Marx 1993: 307). Because of this, the entire regulation of social production is handed over to the dynamics of things produced, which become an 'alien power' that is used to control and enslave workers (Haug 2005: 162; Rehmann 2014: 40; for a critique of the increasing alienation of academic labour through new productivity-enhancing technology, see Hall, Chapter 7, in this volume).

Commodity fetishism thus has a real material basis, and is therefore not mere illusion. Yet, it is still attached to various ideological distortions and mystifications regarding what is going on around us (Harvey 2015: 4). Such mystifications are part of our daily existence: We encounter goods that support our daily life without much knowledge about the specific conditions under which they have been made. Advertisements concerning digital innovations or the very design of how these products appear to us (e.g. the 'individualized' plastic covers of smart phones or the shiny graphic interfaces of apps) masks the exploitation in which their production is enmeshed. Ideological discourses and practices that surround such commodified innovations and their systems of production aim to naturalize and make us 'feel at home' with these alien, 'estranged forms' (Rehmann 2014: 49).

New digital information and communication technologies have often been singled out as the defining technologies of the current age, allegedly based on knowledge, sharing and the freeing up of human creativity. It is especially due to this dominant role that digital technologies have been endowed with fetishist characteristics. In what follows, I will call into critique the fetishism that comes forward in contemporary innovation-speak and practices surrounding new digital technologies and innovations. My critique takes aim, first, at the most fetishist type of innovation discourses, which are based on neoliberal conceptions of the market. I will reconstruct these pro-market notions of (digital) innovation, focusing on the economic and management theories on which they are based. Second, I will offer a contrast to the dominant views by examining Mariana Mazzucato's work concerning the 'entrepreneurial state', which offers an influential antidote to neoliberal innovation perspectives. However, Mazzucato's ideas are uncritical of state power and undeveloped from a state-theoretical perspective. Third, I will elaborate on these critiques by examining innovations that most clearly run counter to the sanitized perspective from which they are typically viewed (see Gripenberg, Sveiby & Segercranz 2012). This will help to expose the blind spots of both mainstream pro-market accounts and the state-centred perspectives. I will use two innovations intimately tied to digital technologies as examples, namely, financial innovations and military technology. I will conclude the chapter with remarks concerning features that need to be included in a critical theory of digital innovations that is capable of shedding light on the mentioned blind spots.

Innovation, Entrepreneurship and Neoliberalism

Today, the mainstream public, political and managerial understandings of innovation are organically connected to market-oriented assumptions and claims, for which reason they cannot be understood without references to neoliberal ideology. The defining feature of neoliberalism is its collapse of separate economic, social, political or cultural spheres to a single economic logic and concept of value (Davies 2014). Accordingly, there are no separate forms of rationality and no room for pluralistic political discourse that questions the existence of private markets: The advocates of neoliberal policies want to remove existing barriers to capitalist activities and value judgments. This happens not in the absence of state power, but with the help of a neoliberalized state that sees its role as the facilitator of markets through privatization and deregulation. Demonstrating the power of such conceptions, the recent decades have witnessed a simultaneous attack on the welfare state and the promotion of government intervention to extend the reach of markets and competition across all social and cultural spheres, including education. As mainstream innovation-speak and policies are founded on an idealistic understanding of the benevolence of competitive markets, corporate CEOs and entrepreneurs have become objects of capitalist idolization (Bloom & Rhodes 2018). By contrast, the welfare state and the public sector form the main enemy of the neoliberal project, conceived as inertial and inefficient bureaucratic behemoths that suck the lifeblood out of entrepreneurs.

These characterizations need to be specified in the context of existing innovation policies and discourses, which are heavily indebted to (neo)Schumpeterian theories of innovation—in other words, to evolutionary economics that spring from the early 20th-century works of Austrian economist Joseph Schumpeter.

Schumpeter was interested in the instability of capitalist development, of the waves of 'creative destruction' that periodically shake up the capitalist order. For him, such changes were not created by 'exogenous' shocks such as natural catastrophes or wars, as was assumed by neoclassical economists. Arguing against them, Schumpeter (2008: 166) proposed that 'there was a source of energy within the economic system which would of itself disrupt any equilibrium that might be attained'. He credited Marx with the realization that capitalism is an evolutionary process and emphasized that change was a constant, endogenous feature of capitalism. It is based on innovations of various kinds:

> The fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers' goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates. (Schumpeter 2010: 72–73)

For Schumpeter, the main historical subject of capitalism was the dynamic capitalist businessperson. Supported by credit markets, risk-taking entrepreneurs

were the key agents of the capitalist economy, who 'reform or revolutionize the pattern of production by exploiting an invention or, more generally, an untried technological possibility' (Schumpeter 2010: 117). While capitalist entrepreneurs were not driven purely by economic motives, the 'excess profits' promised by new innovations (e.g. superior production technologies) when they gain a temporary monopoly position in the market formed the main motivation for the corporations, financial institutions and venture capitalists who invest in their development. Today, dominant digital technology and platform companies such as Microsoft, Apple, Google and Facebook offer striking examples of such types of 'Schumpeterian returns to innovation' (Garnham 2005: 22).

Schumpeterian ideas do not necessarily lead to market-liberal conceptions of innovation, but they have nonetheless been elevated to the highest level of economic reasoning today. This is because they can easily be linked to the neoliberal worship of 'free markets', wealth and creative businesspeople. One of the most influential management theorists of the 20th century, Peter Drucker developed such understandings during the Reagan era in the 1980s. Claiming that the state-planned 'managerial' economy had come to an end and was gradually replaced by an 'entrepreneurial' one, he argued that this necessitates 'an economy full of innovators and entrepreneurs, with entrepreneurial vision and entrepreneurial values, with access to venture capital, and filled with entrepreneurial vigour' (Drucker 2015: 316). This can only be achieved when such features take root as basic civic values, particularly through schooling that is based on the realization that 'individuals will increasingly have to take responsibility for their own continuous learning and re-learning, for their own self-development' (ibid.: 325).

Such managerial ideas have since become official policies. In EU-wide competitiveness rhetoric, innovation refers to the dynamism of capitalism and the harnessing of human creativity for business purposes, which aims at success in ever-tightening global competition. Echoing Drucker, official EU innovation policies promote the view according to which innovation is based on entrepreneurship and entrepreneurial values. Thus, for example, the National Innovation Strategy of Finland states that 'it is precisely the entrepreneur who has the ideas, capacity to take risks and other necessary abilities that are tied to a clear view of the needs of customers', for which reason 'innovation policy needs to be entrepreneurial policy, which is also an important standpoint for reforming public services' (MEAE 2008: 8–9). The report goes on to lament that the 'entrepreneurial activity' is weak in Finland, caused by 'too egalitarian' educational institutions and innovation policies, which do not encourage 'top individuals and units' (ibid.: 30).

These conceptualizations demonstrate a shift from a Keynesian welfare state model to a 'Schumpeterian workfare state', which focuses on 'the promotion of product, process, organizational, and market innovation', together with supply-side policies that subordinate social policy 'to the demands of labor market flexibility and structural competitiveness' (Jessop 1993: 9). The real structural

changes that have followed from this shift have engendered new forms of subjectification, such as the imperative that all citizens need to become entrepreneurs in one way or another. Dominant motivational narratives of innovation have centred on 'freewheeling entrepreneurs and visionary venture capitalists' (Mazzucato 2014: 63), especially those that are in the business of developing and commercializing ICT products, software, social networking sites and mobile applications.

Taken together, these hegemonic perspectives assume that the market and creative businesspeople form the well from which innovations spring up. Yet, the pro-market views on innovation reserve a role for the state. It should fund basic research and also more directly support and subsidize commercial innovation through various mechanisms. This is as far as it should go and no further: The state should be kept from interfering too much with how innovations are developed. As one Finnish economist puts it from a neoliberal viewpoint: 'The task of the state is to create the conditions in which entrepreneurship and innovations can flourish'—its role is to 'take care of the playing field and oversee rules, but not take part in the game itself' (Pursiainen 2017). Similarly, a neo-Schumpeterian economist emphasizes that, while universities or government laboratories may provide valuable information for innovation, only private firms 'can combine them into a plan for innovation and execute that plan' (Metcalfe 2007: 945).

Such ideas form the mainstream of current policy formulations and media discourses concerning innovation. They offer a pro-market view of how and for what ends innovations are and should be developed, presenting a positive image of commercialized, market-driven 'creative destruction', spearheaded by digital innovation entrepreneurs and digital technologies of all kinds. Presenting a positive legitimation of market-centred innovation that is imagined as the inspirational universe of heroic entrepreneurs, these views are blind to systematic production of destructive innovations and the structural reasons why such production takes place. I will focus on these issues in later sections. Before that, we need to gain a deeper understanding of current public debates on innovation by way of examining challenges to the pro-market perspectives.

The State as a Risk-Taking Entrepreneur

Following the global financial crisis that exposed the public to the negative consequences of deregulated markets, in the 2010s there was a renewal of Keynesian calls to increase state involvement in the economy. As part of this, the view that the state should also take the lead in innovation has gained more ground. In a popular and much discussed book entitled *The entrepreneurial state* (2014), economist Mariana Mazzucato wants to demolish the prevalent neoliberal perception according to which the state should take the backseat and restrict itself to creating the conditions in which market actors can flourish. She emphasizes

that the state has for a long time been important not only as the public financier of innovation activities, but as an active risk-taker that has initiated important science and technology projects, whose fruits the corporate giants, such as Apple, have taken advantage of. Mazzucato's views have been strongly criticized by mainstream economists and neoliberal policymakers, but they have gained a foothold among some high-ranking politicians and innovation officials and experts (especially among European social democratic parties). Recently, the European Commission invited her to draft strategic recommendations on mission-oriented research and innovation in the EU (Mazzucato 2018a).

Contrasting her perspective against standard Keynesian principles, Mazzucato (2014: 31) argues that it is not enough to direct government spending for demand management, nor to rely on redistributive policies or to spend on welfare such as health and education. What is also needed is a left-Keynesian 'growth agenda' that supports a productive economy, and this can be done by connecting together 'Keynesian fiscal spending and Schumpeterian investments in innovation' (ibid.). Mazzucato does not deny the importance of private entrepreneurial activity, but notes that it is not enough and that it should not be considered in reverential terms. Referring to the Internet, Mazzucato points out that it happened not only because the private sector in the United States could not finance its development, but because the government had a vision 'in an area that had not yet been fathomed by the private sector' and was willing to invest in its commercialization against the unwillingness of the private sector to do the same (ibid.: 22).

Mazzucato turns common Schumpeterian conceptions around by comparing the state to a bold tiger and businesses to domesticated animals, in reference to John Maynard Keynes' famous notion of 'animal spirits' (which refers to the gut-instinct assumptions that guide business investments). Against the view that such animal spirits are characteristic of businesses, she claims that the opposite is often the case, and nowhere more so than in the world of innovation, where uncertainty is high. Thus, 'even during a boom most firms and banks would prefer to fund low-risk incremental innovations, waiting for the State to make its mark in more radical area', such as green technology or ICT, which have required 'a bold government to take the lead' (Mazzucato 2014: 7). When it comes to most radical, path-breaking innovations, the state has been far more than just the facilitator of the 'dynamic' private sector; it has been the most courageous risk-taker, while market actors are typically too timid and much too concerned with short-term profits to be able to engage in the development of radical innovations that require long-term commitment.

Apple, the largest company in the world by market value and the producer of some of the most emblematic digital devices today, offers an interesting example of this. Celebrated as the paradigmatic example of a company that combines an expansive market orientation with a creative culture of innovation, its products are actually based on decades of state support of research and development (R&D). iPhones and iPads are hybrids of a dozen or so different technologies,

including silicon-based semiconductor devices, liquid crystal displays, lithium batteries, the Internet, cellular technology, global positioning systems (GPS) and multi-touch screens. All of these technologies that have made Apple's products and profits possible derive from major, mostly US government-sponsored research programmes, state-funded military projects, public procurement contracts or research done in various public research institutions (Mazzucato 2014: 87ff). While it did not develop these technologies, Apple innovatively integrated them into well-functioning consumer product designs, based on the skills of its engineers and, no doubt, on Steve Jobs' ideas about simplicity of use.

Media accounts and biographies focus exclusively on this latter aspect of Apple's success story. What gets lost in these tales of visionary entrepreneurship is the fact that the history of digital communications technology bears the mark of the very visible hand of the state. Besides the basic technology, Apple received cash support from the US government for product development and it benefited from its tax, trade and technology policies. For Mazzucato, the constant bashing of the state's assumed incapacity to be efficient and innovative ignores the inherent risks of massive state investments, which have been instrumental in the development of digital technologies. Such state-averse discourses have real material effects, for the endlessly perpetuated free market myths have assisted financial and corporate lobbyists in their successful effort to lower capital gains taxes, which has undermined the state's capacity to fund further R&D (Mazzucato 2014: 19).

Here, Mazzucato touches on a crucial aspect that is for ideological reasons ignored in pro-market innovation discourses: tax avoidance. It is typically conducted with the help of tax havens that offer a low-charge or non-existent tax environment for capital owners. A recent study focusing on the largest US corporations revealed that Apple booked a whopping US$215 billion to tax havens in 2015, 'a sum greater than any other company's offshore cash pile' (Phillips et al. 2016: 2). Apple is far from being a lone example, for the overwhelming majority of the world's biggest corporations, including the main digital platform companies, rely on similar schemes. In 2015, some 367 US companies out of the Fortune 500 maintained over 10,000 tax haven subsidiaries, which would 'collectively owe US$ 717.8 billion in additional federal taxes if the money were repatriated at once' (ibid.).

Corporate tax evasion is not limited to the United States, and it has strong negative consequences in terms of innovation at large. When the big ICT companies that have profited from big state-initiated technology projects avoid paying taxes, they prevent the state and the taxpayers from being rewarded for their key role in investing in digital innovations (Mazzucato 2014: 171–175). Tax avoidance undermines the capacity of the state to fund valuable public programmes, including goal-oriented technological R&D that opens up possibilities for the development of future technologies. This is curiously self-defeating, since the short-term profit opportunities offered by tax havens erode the funding base for major state-based innovation activities that private

companies themselves have taken advantage of. Obviously, the need to accumulate and compete against rivalling capitals overrides long-term rationalities.

More recently, Mazzucato (2018b: 213ff) has examined the ways in which digital companies such as Google, Amazon and Facebook operate their businesses by collecting and analysing huge amounts of online data for advertising purposes, which has resulted in the centralization of the digital networks and concentration of profits into the hands of few corporations (for a critical discussion of Facebook's targeted-advertising revenue model, see Dahlberg, Chapter 4, in this volume). Mazzucato advocates increasing the state regulation of digital platforms through anti-trust legislation, which is conspicuously absent in the realm of digital economy, and with the help of coordinated political action against tax avoidance. At present, many states compete with each other in attracting corporations by offering the lowest corporate tax rates. For example, as was widely reported in the news media, Ireland gave Apple a 0.005 per cent tax rate in 2014 and was for a long time unwilling to go along with European Commission demands to get the company to pay more taxes to the country.

Mazzucato reminds us that digital technology innovations are the result of collective processes, for which reason its rewards should also be collectively distributed, rather than privately appropriated. However, her work has some eye-catching blind spots itself. While she examines innovation as a collective process, she views this from a perspective that lacks attention to capitalist production relations. Due to this, the state comes forward in her analysis 'as an external, super-societal entity, representing "the public" and "collective interest"' and she also neglects workers and the structural inequalities between labour and capital in the collective process of innovation (Pradella 2017: 66). In a sense, Mazzucato offers a mirror image of neoliberal myths of digital innovation, by dethroning the markets from their ideologically preeminent position and by offering a positive image of the entrepreneurial state in its place. This view is much less radical than it initially seems, however. Lacking a critical dimension of capitalist production relations and a political concept of the state, she does not ask such questions as who controls innovation and for what purposes, which are more critical questions than 'who gets the return?'. (ibid.).

Such questions lead to the need to conceive of digital innovations not as essentially good and desirable things, but as technologies whose development is embedded in the political-economic context of capitalist commodity production and social relations. Because of the presence of structural inequalities and asymmetrical social power relations in capitalism, which the liberal-democratic state by its nature cannot fully transcend even in the best of conditions (Wood 2012), innovation and technological development bears the mark of such hierarchies. Next, I will focus on these aspects by examining, first, financial innovations, and second, military technology, both of which are currently enmeshed in the digital mode of production.

Destructive Creation I: Financial Innovations

Today, economic and social reproduction have become dependent on the financial system and the increasingly complex financial innovations associated with it. Financial activities were not foreign to the previous Fordist–Keynesian accumulation regime that lasted until the late 1970s in advanced capitalist countries. However, neoliberal market deregulation since the 1980s has opened the doors for a huge growth of the financial sector globally. In the 1960s, the financial sector's share of gross domestic product in the United States was under 4 per cent, while in 2010 (three years after the beginning of the global financial crisis), the same figure was 9 per cent, a trend that is visible across industrialized nations in general (Godechot 2016: 504). This has led to a growing disparity between the industrial ('real economy') and the financial sector. The latter's share of total domestic profits in the United States has grown from 10 per cent in the 1950s and 1960s to over 40 per cent in the 2000s, which has also made financial elites, such as hedge fund managers, supremely wealthy, well ahead in earnings compared to top managers in industry (Hossain-Zadeh 2014: 67; Smith 2017: 243).

These shifts among competing capitals and capitalists testify to the forceful financialization of the global economy since the 1970s. With declining real wages and purchasing power, households have resorted to 'privatized Keynesianism'—borrowing money from credit markets to maintain their standards of living. This has led to a huge rise in private indebtedness. The everyday life of ordinary workers and citizens, their daily reproduction, has become pervaded by financial products of all kinds, such as consumer credits, mortgage loans and privatized pension arrangements (Brand & Wissen 2018: 60). This has made labour all the more vulnerable to the neoliberal goal of increasing the rate of exploitation of workers and dismantling welfare state provisions. At the same time, the growth of the financial sector and the attempt of the industrial sector to secure profits through investing in financial assets in lieu of investing in the real economy has further strengthened the importance of the financial sector relative to the overall economy (Smith 2017: 240). It is not only that the financial sector has grown by itself. It has been accompanied by new managerial and business practices whereby traditional manufacturing firms have increasingly turned to financial services to boost their profits, becoming financial firms themselves in the process (Mitchell & Fazi 2017: 133).

The increasing flow of money into financial markets and the hands of top investors and managers has created 'the need for finance and the super-rich to continually develop new forms of value extraction' (Davis & Williams 2017: 15). Since the 1980s, with the help of neoliberal deregulation policies and the introduction of new ICT, financial companies have contributed to the massive expansion of financial investment by ceaselessly developing new financial innovations. Assisted by new computer technology and statistical software that eased the burden of complex price calculations, financial firms set off 'an

unprecedented acceleration of financial innovation': In the late 1980s, 'a fundamentally new type of financial instrument was launched in every two weeks' (Sveiby 2017: 145). While financialization is primarily the outcome of political decisions, new digital ICTs were central to its intensification and in shifting the centre of gravity of innovative activities away from the productive sectors and towards financial markets. As Smith (2017: 241) points out,

> any serious discussion of the contemporary 'knowledge economy' must begin with the fact that the fastest rate of product innovation, the largest private-sector investment in information technologies, and the greatest private-sector concentration of advanced knowledge workers, has been found in the financial sector.

New ICTs have been central to one of the most destructive aspects of financialization: securitization. It refers to the practice of bundling ('collateralizing') a huge amount of individual loans, such as mortgages, car loans and credit card debt, into larger financial products, which are then sliced, with the help of computer-assisted calculations, into other financial instruments ('securities'), such as collateralized debt obligations (CDOs). These products created by major multinational investment banks in the 1980s and 1990s promised high returns at low risk for investors. In the mid-1990s, financial experts hailed CDOs as 'the most successful new security product of all time' (Sveiby 2017: 145), and they were bought and sold in huge quantities on Wall Street in the lead-up to the 2008 financial crisis. Their success overshadowed the fact that 'securitization led to a dizzying array of extremely complex instruments that—quite literally—no one understands' (Papadimitriou & Ward 2010: 21). This prompted Warren Buffet, one of the world's most well-known investors, to dub them 'financial weapons of mass destruction'. Although certainly not the sole reason behind the global financial crisis, the destructive power of these innovations became evident when the credit-fuelled US housing bubble burst in 2007 and the value of CDOs quickly collapsed, triggering the meltdown of banks in the United States, and then around the globe, that had invested in the various interconnected financial products.

Besides assisting in the creation of new financial innovations, digital technologies are at the heart of current global financial market infrastructure. Financial trading is digitalized, and an interesting innovation in this regard is high-frequency trading (HFT). This differs from earlier electronic forms of financial trading in that, instead of direct human involvement, trading is conducted fully automatically via computer algorithms and programs. HFT represents 'the culmination of decades of technological innovation and regulatory developments encouraging financial automation' (Lange, Lenglet & Seyfert 2016: 154). The appeal of HFT is based on its ability to execute financial orders at very high speed and to detect small trading opportunities in the markets. HFT systems do this by comparing available prices and price fluctuations

between exchange venues and by taking advantage of temporary price inconsistencies to make profits (Bajpai 2014). HFT involves small individual trades in high volume, which has significantly increased the overall volume of financial trading in the 2000s (Chaparro 2017). The quantities are awe-inspiring: Typically, messages concerning bids to buy or sell shares are sent by computer algorithms at a rate of millions per second between the main US share-trading data centres. According to current estimates, about half of US share trading is done via HFT (MacKenzie 2018: 1636–1637).

Speed and thus computing capacity are essential for HFT companies, which has resulted in an arms race between them as they seek to keep ahead of each other in digital-technological development. In the case of HFT, the advantage is measured in milli- or microseconds. For instance, an HFT company that monitors the trade of comparable financial products (e.g. treasury bonds and futures) between the New York Stock Exchange and Chicago Mercantile Exchange can earn a small profit by optimizing the material communication connections between these marketplaces to be able react faster to price changes in those products (Lange, Lenglet & Seyfert 2016: 154). HFT firms are compelled to continuously invest in ultra-fast fibre-optic cable connections and microwave technology to 'shave off a few milliseconds in the transmission of data' (ibid.), in an attempt to gain an advantage over rivals. Similarly, high-frequency traders want to have their computer servers as close to stock exchanges as possible, because this also decreases the time of digital data transmission.

Such financial and finance technology innovations exemplify the high risks attached to financialization in the conditions of neoliberal market liberalization. The sheer amount of new digitalized financial innovations and their voluminous use at amazing speeds make them inherently difficult to supervise, regulate and control. Due to the fast rate of financial innovation, some post-Keynesian economists have suggested that, instead of even attempting to regulate certain complex financial instruments that encourage ever-riskier activities, they should simply be banned (Papadimitriou & Wray 2010: 26). Overall, digitally driven financial innovations have contributed to the destabilization of global economy, with severe negative social consequences. Present government policies that lead to the bailouts of speculative financial institutions when they go bankrupt encourages these institutions 'to go further in their reckless financial ventures and precipitate new financial bubbles' (Hossain-Zadeh 2014: 69). Under this systemic logic, the risks are privatized, but the losses are socialized, in a way that has clear class character. The global financial crisis has been used not as a reason to dismantle the neoliberal policies as dysfunctional, but as an opportunity to justify austerity cuts in social spending and public services. The latter are falsely blamed for escalating public debts and deficits—whereas, in reality, the crisis was caused by the financial sector—which is then used to justify further redistribution of national income in favour of the rich (ibid.: 76–81).

In light of this, conceiving digital financial innovation in terms of positive Schumpeterian creative destruction seems misplaced; it should more aptly be called destructive digital creation. Again, digital technologies by themselves are not the fundamental cause of financial bubbles and crises, since the ways in which they are employed are embedded in broader capitalist social relations and structures, together with politics regarding their development. Yet, the digitally assisted creation of ever-more complex products of the 'dealer economy', together with how financial markets are structurally interconnected via global ICT networks, means that the systemic risks associated with financialization have grown considerably as local crisis-inducing events quickly spread from one place to another, often with catastrophic cumulative effects (Johannessen 2017: 151–152).

In historical terms, financialization is an attempt by the capital to compete against falling profit rates by investing in fictitious capital. This has made some capital owners supremely wealthy, at the same time as the capitalist economy is increasingly based on computer-assisted financial innovations that construct value within the credit system, without any concern for the social value and consequences of such fictitious capital formation (Harvey 2015: 110–111, 240–241). More and more capital is invested in speculative profit-seeking through financial instruments, rather than in productive innovation. Due to its uncoupling from productive activities, this interest-bearing capital formation is also the most fetishized and the most 'insane' form of capital (Marx 1992: 547; Marois 2012: 139). Digitalized financial innovations are a weapon in the hands of financial elites who aim to circumvent government regulations in a search for quick profits in the financial sphere, in ways that have enormous negative effects on the economy and society at large.

Destructive Creation II: Military Technology and Digital Information Warfare

The core institutions of capitalist business, such as modern corporations or financial markets, are not the only sites of systematic innovation. As Mazzucato reminds us, the state has been a major supporter of R&D, out of which many central innovations of current high-tech capitalism have emerged. However, Mazzucato does not focus on technologies towards the development of which the state has most prominently contributed in many leading countries: military technology. This is no less important an area of innovation than the development of innovations that serve capitals' never-ending need to raise productivity due to the laws of market competition. Although capitalist corporations and state apparatuses are interlocked economically and politically, we need to analytically separate the expansionary tendencies of capital from the geopolitical struggles for power that drive forward the development of military technology.

This form of destructive innovation is typically left undiscussed in mainstream academic discussions, which tend to focus on 'good' innovations.

Many of the biggest industrial nations are also major weapons technology producers, supported by sizeable military budgets. The United States is the global leader in this regard. In 2017, its official military spending was US$610 billion, worth more than the military spending of the next seven countries combined. Following the United States were China, Russia, Saudi Arabia, India, France, the United Kingdom, Japan, Germany and South Korea. Most of these countries have increased their military spending in the past decade. In 2016, the EU member states spend roughly US$200 billion in defence, while the total global military expenditure was US$1,739 billion in 2017, which represents the highest level since the end of the Cold War (Eurostat 2018; Tian et al. 2018). While these figures are considerable by themselves, they are underestimations. The actual levels of US military spending are much higher when all military-related costs, such as nuclear and space weapons production, maintenance and research costs, Homeland Security costs and satellite reconnaissance and intelligence gathering costs are added to the official numbers (Cypher 2007; Smart 2016). The United States is a somewhat special case, owing to its status as the main military-imperial power with bases all over the world. Yet, in terms of innovation-related activities and national innovation systems, military R&D has been important for many leading countries. At the end of the 1990s, for example, military research absorbed nearly 30 per cent of France's government-funded R&D efforts, while the same number for the United States was 55 per cent, and it was nearly 40 per cent for the United Kingdom (Bellais 1999). (For more recent numbers and discussion of defence R&D 'as a key channel through which governments all over the world shape innovation', see Moretti, Steinwender & Van Reenen 2016.)

Military technology is closely tied to ICT. Ever since the 1940s, military R&D has been essential for the development of many important ICT and digital innovations, while today, weapons and weapons command-and-control systems are, in turn, increasingly digitalized and based on the use of ICT. This has 'resulted in a relocation of R&D and procurement spending, away from traditional weapon platform and weapon system producers and towards electronics and computer companies' (Brzoska 2005: 15). This development is often discussed under the notion of a *revolution in military affairs* (RMA), which refers to 'the marriage of new technologies with organizational reforms and innovative concepts of operations' (Goure 2017). As part of this discourse, the Pentagon and US military planners today emphasize the application of the newest ICT in warfare. A strategy researcher working for a defence-focused Washington think tank enthuses about the benefits provided by 21st-century digital warfare:

> [D]igital technologies have become the linchpin of U.S. weapons, tactics, and strategy. Soldiers on the battlefield coordinate air strikes using

> digital datalink and a tablet. Headquarters commanders, once reliant on radios to receive battle updates, watch digital feeds of streaming videos on common operating pictures populated by terabytes of near real time digital data. Cruise missiles and bombs receive satellite relays of digital navigation and targeting updates to destroy enemy targets day and night, in rain and snow, in foliage-covered jungles and dense urban centers. Digital data and the networks that store, process, and disseminate that data have made the U.S. military extraordinarily capable. (Schneider 2016)

Such developments advance the interests of both the US imperial state and its corporations, and they have long historical roots. From the times of the Truman administration and the Korean War onwards, 'military Keynesianism' became accepted by the US elites as a macropolitical framework: It refers to the ties of the US economy to military spending, military-supporting research and overseas wars. Military Keynesianism was a policy that not only helped to advance US geopolitical interests, but also profited private corporations and accelerated technological innovation, giving a great boost to the US economy in general. In the early days, the policy was ideologically supported by the Cold War confrontation, but as can been seen from the figures referred to above, its end did not spell the end of a high level of military spending in the United States. The post-Cold War regime of 'global-neoliberal militarism' exists as a means to generate profits for the private sector (Cypher 2007). A large number of private US companies (between 20,000 and 60,000) operate as contractors that benefit from Pentagon orders. High-tech digital companies in Silicon Valley and elsewhere are deeply involved in them, for the reason that there are huge profits to be made from military R&D projects and military contracts ordered by the armed forces. Linda Weiss (2014) shows that the United States' current capacity for high-tech innovation derives from its 'hybrid political economy', in which the 'national security state' and its federal agencies collaborate closely with the commercial sector in pursuit of military- and security-related objectives.

In recent decades, the nature of high-tech military development has changed, in tune with the so-called War on Terror and the byzantine threats associated with it. 'Information warfare' has now become a growing business, leading to an evolution from 'military-industrial' to 'military-information complex' (Smart 2016: 458). Between 2001 and 2013, US spending on intelligence doubled, and the digital data capture by the National Security Agency (NSA)—heavily involved in spying scandals that have undermined civil liberties through global monitoring of digital communication networks—has constantly increased, with an increasing amount of government intelligence work outsourced to private contractors (Bloomfield 2013; MacAskill & Watts 2013).

Those who want to defend high-level military and intelligence spending often claim that military R&D has positive economic effects, since it creates spin-off technologies for the civilian sector, as in the case of advanced defence research

projects that gave birth to the Internet. There is no need to disprove this argument completely, but it is very problematic from the perspective of democracy and citizen well-being. Indeed, one of the key reasons why the US elites have favoured military Keynesianism and its continuation in various forms is that massive state spending on the military is a better alternative for them, for reasons of power and privilege, than spending on social welfare. This is because social spending may

> arouse public interest and participation, thus enhancing the threat of democracy; the public cares about hospitals, roads, neighbourhoods, but has no opinions about the choice of missile and high-tech fighter planes. (Chomsky 1994: 100–101)

In other words, spending on the military helps to keep power and profits in the hands of coercive state and corporate elites, rather than distributing them more democratically.

Spending on the military has also had undesirable effects for higher education. Writing about the United States, Henri Giroux (2008: 58) argues that 'the university has become an intense site of militarization'. The repercussions of this are not limited to the United States, for besides military research contracts in the home country, in 2006, the US Department of Defense had contracts with 161 universities in 33 other countries around the world, while a study found that, in the early 2000s, 26 UK universities had 1,900 military-related research projects, amounting to a total value of £725 million (Smart 2016: 467). In the countries so affected, the militarization of universities has a negative influence on academic freedom and democracy, especially in the current neoliberal conditions where direct government funding for higher education for civilian purposes is decreasing and funding for research with military purposes, with private sector weapons-manufacturer involvement, is increasing (ibid.). What this means in concrete terms is demonstrated by an event involving Johns Hopkins University, the largest recipient of Pentagon funding of higher education. In 2013, a professor of computer science was asked by the dean of the university to take down from the university's server his blog post that was critical of the NSA's effort to defeat the encryption of online communication (Rosen 2013).

Today, former military enthusiasm with war machines made of steel and aluminium has given way to digital war imagery that is displayed in tech magazines, tech sections of mainstream news sites and military industry advertisements. Thus, a Fox News report lists 'the 5 coolest military innovations of 2016', including 'surveillance drones that terrorists cannot escape' and synthetic 'Superman-style vision for combat helicopter pilots' (Barrie 2016). Similarly, an online brochure of Accenture, a global consulting firm, waxes lyrical about 'five trends that stretch the boundaries of digital defense'. These include software intelligence and data analytics that 'apply computer vision algorithms to video surveillance feeds' to 'enhance response capabilities'—innovations that

can be used both on the battlefield and for crowd control in the cities, as the same brochure favourably notes (Accenture 2015). Even US President Trump's megalomaniac and racist 'border wall' idea is welcomed by tech magazines and Silicon Valley start-ups as an opportunity to develop advanced digital surveillance technologies with state backing. For example, a *Wired* article from 2018 draws a flattering portrait of a start-up company that works on a pilot programme for the US government to develop an all-seeing 'digital wall' at the US–Mexico border, with the help of virtual reality and artificial intelligence (Levy 2018).

How technological rationality has become fused with collectively destructive actions and undemocratic structures of social control was a central theme for early Frankfurt School critical theorists. Ernst Mandel continued on this theme in the 1970s in light of the centrality of 'permanent arms economy' for late capitalist societies. For him, the ideological sphere of late capitalism is infested with beliefs in the omnipotence of technology to offer solutions to complex economic and social problems and 'to integrate rebellious social classes' (Mandel 1975: 501). In terms of military technologies, such 'fetishism arises when it is presumed that all geopolitical problems have a military solution and that military solutions are guaranteed by superior technologies' (Harvey 2003: 9). In reality, however, such solutions are partial and temporary ones at best, and 'superior' military technologies have often been defeated by less-advanced countermeasures. Such persistent ideological thought forms demonstrate how modern capitalist rationality is split between partial rationality and overall irrationality. The most dramatic military expression of this is the development of ever-more effective weapons systems in an 'effort to organize the collective nuclear suicide of the humankind with the greatest possible "economy of human labour"' (Mandel 1975: 510). The overall social irrationality of capitalism—the preference for short-term profit-making and military spending on warfare instead of general welfare—is now carried forward with the help of the latest digital technology innovations, without proper discussion concerning the (in)human purposes that they serve as fetishist objects of capitalist and authoritarian state desire.

Conclusion

In the above, I have focused on the blind spots of digital innovation fetishism, especially the widespread incapacity to observe the negative social implications of key areas of current digital high-tech innovation. The belief in the benefits of commercialized innovations of all kinds remains strong, with little attention to their negative consequences and how these are connected to basic capitalist tendencies. The examination of computer-assisted financial innovations and new digital trading practices shows the destructive power of neoliberal financialization. Rather than expressing a supposedly benevolent capitalist spirit

that nurtures the innovation of new financial instruments, the high risks associated with them testify to the need to keep such profit-seeking spirit at bay, although this is increasingly difficult in the present political configuration. The pervasion of the everyday life of consumers by financial products and credit has entrenched the logic of ceaseless risk-taking and speculation as a new social norm (Konings 2018).

The case of military technology demonstrates how deeply current digital innovation is linked to the advancement of the security interests of coercive state apparatuses such as the military and the intelligence services, together with the private companies that benefit from such interests. Mazzucato's analysis of the entrepreneurial state offers a necessary corrective to market-centred innovation discourses, but her work proceeds 'without even mentioning developments in military and surveillance technologies' and fails to register that 'surely nuclear weapons, depleted uranium and drones also need to be taken into account if we are properly to assess the character of the entrepreneurial state' (Pradella 2017: 68). In brief, Mazzucato operates with a strangely depoliticized concept of the state (Pfotenhauer & Juhl 2017).

A critical assessment of the role of the state and corporations in the development of military technology and other innovations needs to start from the realization that, like capital, the state is a social relation, a 'specific material condensation of a relationship of forces among classes and class fractions' (Poulantzas 2000: 129). From such a perspective, one can avoid viewing the state as a subject that has autonomy and that acts as a rational agent of civil society (as in Mazzucato's views concerning the 'entrepreneurial state'). On the other hand, the state is also not a thing, a tool so completely without autonomy that it is purely at the service of monopoly capital and corporations (ibid.). When viewed from a relational perspective, the state is an active field of political struggle, whereby 'the exercise and effectiveness of state power is a contingent product of a changing balance of political forces', conditioned by the wider political-economic system (Jessop 2009: 428). This means that, in any historical conjuncture, some agents, actions and interests have priority over others in the policies of the state. Luckily, the state is not only coercive or only in the service of capital, for it has historically also had more democratic features, such as providing health care, education, labour laws, cheap food and so on. Concurrently, what functions and interests the state prioritizes is indeed subject to collective political will formation.

These contingent forces guide the forms that technological innovations take in different historical and national contexts. The case of military Keynesianism and state-directed military R&D, out of which the key ICT innovations of current high-tech capitalism arose, is illustrative in this sense. As noted, it reflected the preferences of US elites to subsidize that part of the economy that was conducive to the maintenance of corporate class and military state power, rather than civilian welfare. Today, the R&D of digital technologies is affected by the weakening of civilizing, educational institutions and the increasing influence

of neoliberal business orientation over them. As Smart (2016: 464) observes, 'higher education has been recast as the institutional nexus for producing highly qualified labour power ready for inclusion in corporate enterprises integral to a digitalized, informational, neoliberal capitalist economy' (see also Hall, Chapter 7, in this volume). At the same time, the general political shift towards authoritarian populism in Western democracies further weakens the prospects of developing innovations that serve democracy and human emancipation.

Thus, there is no guarantee that 'national innovation systems' and the development of digital technologies within them serve democratic ends. Digital innovations become fetishes when perceptions regarding their production are divorced from the context of capitalist social relations and the formation of state power as the outcome of political struggles. Digital innovations are conceived fetishistically when they are imagined as solutions to complex social and environmental problems, when they are idealistically discussed as things that have benefits for 'everyone' and when it is assumed that such benefits will proliferate when educational institutions of all kinds focus on indoctrinating their subjects to become market-oriented entrepreneurs. In order to avoid such fetishisms, digital technological innovation and the role played by the 'entrepreneurial state' need to be politicized, and those working and studying in the universities need to ask critical questions concerning the direction of digital technological innovation and the systems of production and consumption that surround them.

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CHAPTER 3

The Screen as Instrument of Freedom and Unfreedom

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The Homology of the Screen and the Watching Self

The relationship between humans and technology is not simply one of analogy, but the tighter one of homology.

The terms originate in biology as it was on the cusp of evolutionary theory, and from Richard Owen's work in particular (Boyden 1969: 455). The homology concept not only encompasses the idea of similar function, but also that of similar structure. The analogy concept gestures only to similarity of function, one that is not necessarily related to similarity of structure. As the idea of similar structure was overtaken by that of shared ancestry—and, finally, genetics—it became common to emphasize that homologous structures need not have similar functions, although Owen intended to describe most especially those which did (ibid.: 456).

At stake is how to classify relationship. We miss something essential about our technologies if we do not analyse them, and not only with respect to commonality of function, but also with respect to shared ancestry. As Galit Wellner argues, part of the cell phone's attraction is that it has a quasi-face and functions

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as a quasi-other (2016: 105–123). The cell phone screen is not only analogous to some features of the human face, especially looking and expressing emotions. Additionally, it is homologous, generated by histories of watching through which devices and watchers have mutually conditioned one another.

Wellner argues that the concepts 'human' and 'technology' co-evolve (2016: 127). When we define the human as tool-wielding, we have already demonstrated her point. We are less likely to go in the other direction, however, and to see technologies as imbricated in their development with the humans they circumscribe. Describing this double motion, Wellner writes:

> Technology is a prosthesis in the sense that it is an object-based memory of humans. As prostheses, technologies are the exteriorization of the human memory. By complementing the interiority of humans—and not through imitation as [Vannevar] Bush thought—technology functions as a prosthesis. The prosthesis is not a simple copy of the human but rather a transformative object. For instance, the invention of the wheel was not a recording of a memory of a certain type of movement but rather a new form of movement. Once the wheel was invented, the production of similar technological artifacts could be regarded as the externally recorded memory of what is Human. Vice versa, the exteriorization of 'The Human' is the mnemonic function of technology. This double structure makes Technology un-dissociable from the human. (ibid.)

In order to give our technologies genealogies, in Nietzsche's sense of the term, we must thus also think of them as homologies in Owen's. A set of allied concepts from Wellner is useful, especially co-constitution, memory, and prosthesis. Only with this set of concepts will we be in a position to ask how our technologies evolve: not only with respect to the technologies that preceded, but also with respect to humans with whom they not simply interact, but actively share bodies and minds. And only then will we be in a position to ask after the political possibilities of the world we have thereby described.

Nowhere is this set of questions more salient than with respect to our screens.

We know from critical theory that the 20th-century cinema screen and fascism were deeply imbedded. And yet, both the cinema screen and its heirs have been present in some other political forms. This suggests that the screen can stabilize more than one kind of political form. Is this really so surprising, since it shares its heritage with the human? The cell phone and tablet screen may even advance democratic social forms.

Before turning to this issue, we must first get clear on the kinds of screens that are most salient to our everyday experience and the features of these screens. For this reason, we will first turn to some of the details of Wellner's account of the cell phone. Only then will we be able to distinguish the features and usages of screens that amplify our unfreedoms from those that advance our freedoms.

The last two sections of this chapter will attempt to tease these freedoms and unfreedoms apart.

Wellner and the Evolution of the Screen

The screen most prevalent in our everyday lives is the cell phone. The questions, then, are: what memories does it exteriorize, and what kinds of humans does it project? Before answering these questions, Wellner first gives us an account of the cell phone's evolution, as a device. She traces the changes from the early versions of cell phones into later ones, as the device makes the transition from analogue to digital technologies.

The most important transition is the larger and more important screen (2016: 91–93). The screen feature becomes so prominent in the devices that Wellner will describe it as the 'victory of the visual over the auditory' (2016: 52). It is also, interestingly, a victory for writing and literacy, although not in traditional forms (2016: 39–44). As screens became larger on the cell phone and, by extension, the tablet, they also became smaller. The normative computer, television and movie screens were all larger, but less convenient to carry around than the cell phone or tablet screens.

Wellner writes in the tradition of Marx's theory of technology, a tradition that emphasizes the ability of our technologies to advance both freedoms and unfreedoms. Sometimes, the very same technology can do both. And, in Marx's account, this does not always happen in a simplistic way (1973; 1983).

Drawing on Marx, Andrew Feenberg uses the example of the adaptation of industrial machines to the height of children, taken as a sociological fact: and used, interestingly, as an argument that only children could operate such machines (1999: 86–87). In light of such an argument, child labour does seem mandated by machines. Technology hobbles and curtails human possibilities. Importantly, however, it only does so because machines have been built this way in the first place.

Applied technologies are never totally neutral, as they are always 'built up" in some way to accommodate social ends and purposes. Again, Feenberg is helpful:

> [The thesis that technology is politically neutral] reifies technology by abstracting from all contextual considerations. This approach is relatively persuasive because, as in other instances of formal bias, the decontextualized elements from which the biased system is built up *are* in fact neutral in their abstract form. The gears and levers of the assembly line, like the bricks and mortar of the Panopticon, possess no intrinsic valuative implication. The illusion that technology is neutral arises when actual machines and systems are understood on the mode of the abstract technical elements that they unite in value-laden combinations. Critical theory shatters this illusion by recovering the forgotten contexts

> and developing a historically concrete understanding of technology. (2002: 82, emphasis in the original)

Societies can also selectively develop technologies that advance unfreedoms, while ignoring others that might advance freedoms. Engels, worried already in 1865 about the mining particulates affecting air quality in and around Manchester, noted our reliance on fossil fuels (1975: 530–547). This insight did not cause either him or Marx to give up on their interest in energy technologies or their unexplored possibilities. Among other reasons, this is why they were excited, at the end of their lives, about advances in electricity.

Marx's theory of technology's ambivalent possibilities came to Feenberg elegantly via Herbert Marcuse. Paulo Freire also derived the idea from Marcuse, and we shall see his development of it in later sections of this chapter. In Wellner, the idea of technology's ambivalence develops as a criticism of Martin Heidegger, whose inattention to social context causes him to develop a negative view of technological mediation, and also the notion that technology has a singular essence. In place of this, Wellner develops a historically concrete and contextual consideration of the cell phone and tablet screen. She is careful to attend not only to the unfreedoms that these screens may direct, but also to the freedoms that they enable.

In place of the singular Heideggerian technological essence, Wellner offers a discussion of three invariants that are features of the large-screen digital cell phone. The first invariant is the phone's function as both a wall and a window, a mechanism for dividing attention in one of several ways. The second invariant is the cell phone's function as a quasi-human face: she might have noted that the increasing size of the cell phone screen causes it to approach the actual size of the human face; this is accomplished in the tablet. The third invariant is the cell phone's memory prosthesis: the way in which the cell phone functions as part of the human mind.

Wellner's concept of 'multi-stability' helps describe the amplified ambivalence of the cell phone when compared with other technological artifacts (2016: 12–13). Wellner argues that while technological artifacts like Heidegger's hammer can be used in more than one way, limits of use and function are often built into their design. In most contexts, we would feel silly carrying a hammer around, and this is rarely if ever true of the cell phone. So while we might use the hammer as a paperweight, it could hardly become an object of what Wellner calls 'everyday carry' for most of us, unless we were carpenters (2016: 56–57). Even then, the carpenter is likely to have a cell phone, too. That is to say, the cell phone has a greater degree of multi-stability than the hammer: it has a greater capacity to be used in more ways than other kinds of technological object.

For this reason, Wellner might have added multi-stability as a kind of fourth invariant of the cell phone. In its multi-stability, the cell phone has the ability to join context in many different ways. Already in Marx's account, political ambivalence was a feature even of more modestly stable technologies. The cell phone's

multi-stability thus amplifies its political possibilities. It will be especially able to adapt to new purposes and contexts: both contexts that curtail freedom, and those that advance it.

Screens and Unfreedom

Near the end of Chapter 1 of *Pedagogy of the oppressed*, Brazilian Marxist educational theorist Paulo Freire refers to both of Herbert Marcuse's major works, *One-dimensional man* and *Eros and civilization*. Freire writes:

> More and more, the oppressors are using science and technology as unquestionably powerful instruments for their purpose: the maintenance of the oppressive order through manipulation and repression. The oppressed, as objects, as 'things,' have no purposes except those their oppressors describe for them. (2007: 60)

This criticism applies readily to the face-sized digital screen: take, for example, the screen's role in establishing purposes of the kind Freire warns about here. One of the primary prescribed purposes occurs when the subject to whom screen technologies are addressed is addressed primarily or even solely as a consumer of commodity goods. A companion-prescribed purpose situates the normative human life around the wage-labour form, and the salaried labour form in particular, even if this latter form is only aspirational.

The behavioural decision-making literature emerging from business schools has adopted this prescribed purpose uncritically. Even or perhaps especially when this literature takes itself to be promoting human goods, it does so with an implied premise that the subject to whom it is addressed is either a consumer or an aspirational consumer, with a salaried job.

Consider Shlomo Benartzi's *The smarter screen: surprising ways to influence and improve online behavior* (2015). Benartzi, an UCLA behavioural economist, has innovated apps that help users save for retirement, including projecting an aged photograph of the saver onto the screen. In his 2015 book, he describes applying the same techniques to the health insurance market. He suggests limiting numbers of visual choices on the online health insurance exchanges so that participants can more accurately choose plans suited to their needs, without overpaying.

Noble though these efforts may be, they operate only against the backdrop of a very limited conception of human need. The real fear inspired by the aging photograph corresponds to a society that has accepted senior poverty. The need to economize in health insurance choices corresponds to a society that has accepted that health will be a commodity most available to the very rich. Indeed, in Benartzi's account, the story about how best to present insurance choices on a screen is no different from how Amazon should present its shoes

or how Expedia should present its hotel rooms. In fact, he suggests that we migrate best practices from one platform to another.

For what it may be worth, the magic number is four choices, combined with a sports-based bracket system for limiting down choice types. This schema is especially important if the chooser is choosing on a phone or tablet rather than on a computer screen. The number four helps to avoid overwhelming choosers with too many choices, poorly visible on face-sized screens, and helps to eliminate an empirically documented 'middle bias' that sways decisions if five choices are given. No doubt such strategies work. But they work precisely by enabling prescribed purposes: by setting health insurance alongside footwear, hotel rooms and, perhaps most egregiously, snack foods (Benartzi 2015: 72).

Benartzi also seeks to combat the failures of reading comprehension when reading is done on a screen, particularly in comparison to reading done on paper. Benartzi cites good empirical work, the Anne Mangen Norwegian education study from 2013, in order to demonstrate what anyone with good cognitive training knows instinctively albeit impressionistically: if you read it on a screen, it is harder to remember what you read (2015: 67; see also Baron 2015).

Years ago, I made the mistake of reading Pascal Mercier's *Night train to Lisbon* on a tablet screen: a terrible choice for a novel with words as powerful and beautiful as Mercier's, which I remember only as a general feeling or tone. Even in writing about the experience now, I misremember the title as *Midnight train to Lisbon*, realizing the error only as I put the references section together. Not only am I missing the detail and texture of the narrative, I cannot even correctly recall the title of the book! For this reason, I gathered paper versions of all the books and articles listed in the References section, including Benartzi's, for this chapter: preferring, of course, public versions from libraries in order to minimize the environmental impact of the reading practice.

There is, of course, a literacy bias to the judgment. As Freire points out, the screen has the ability to overcome literacy bias by conveying truths via image rather than word, and so to enable a more diverse array of interlocutors (2007: 121). Similarly, Naomi Baron emphasizes that the new forms of screen reading practices allow an increased use of image alongside text (2015: 6). And, indeed, images that are not simply propaganda can be used to advance truth and freedom. Even still, the literacy loss is still a loss, and particularly for those not already adept at switching between different kinds of reading practices.

Benartzi offers a different explanation for the loss of reading comprehension than Mangen does: one that rightly pays attention not simply to the technological artifact, paper or screen, but rather to the co-constitution of human and screen. Perhaps, he speculates, it is neither the paper nor the screen that fully accounts for the differences in Mangen's study, but rather the habituation of the screen user to certain features of screen technology. We have become, in his hypothesis, habituated to read too quickly on screens, and with interruptions. This habituation bears consideration beyond Benartzi's discussion of the strategy of using difficult fonts in order to slow readers down.

Throughout his book, Benartzi rightly highlights what he calls our 'attention economy'. This is, on the one hand, a culture of speed. It is, on the other, a culture of interruption. In my own work, I have argued that multitasking and interruption are features built into screen technologies (2013: 35); Wellner argues that this is one of the potential costs of a multi-stable device (2016: 96); Daniel Keller argues that acceleration is a feature of contemporary reading habits (2014). In particular, the tabbed web browser, the series of apps running simultaneously, hyperlinks, images and pop-up technologies pull our on-screen attention in several directions, simultaneously. And this is just our on-screen attention. If we try to participate simultaneously in the non-screen world, as we often do, still other vectors are possible. Our devices can even compete with our other devices.

Benartzi cites some of the compelling empirical researches about the negative effects of cognitive load and multitasking on efficiency and comprehension (2015: 29). They replicate my own conclusions about internal time consciousness and its development in contemporary selves (2013: 15–47). Benartzi also connects these negative effects directly to manipulation. Caltech neuroeconomists can manipulate students into choosing snacks they don't like, simply by distracting them and then forcing a choice while they are distracted (Benartzi 2015: 29).

There is, I would like to suggest, more at stake than just snacks.

It would be easy, in light of the Mangen study (2013), to simply wish to return students to paper. Too easy, as it turns out. Doing so would miss the crucial insight that the change is not simply in the surface on which words are inscribed, not simply an issue of saliency, visibility, spatial placement or memory, or lighting. The change is in we readers ourselves.

As we are transformed by the speed and interruption of screen reading, we may well see the comprehension issues that began with screens migrate to paper, as features from the style of reading on screens are imported from the newer to the older surfaces. As Naomi Baron writes:

> It is one thing to observe shifts in the balance between reading modes. It's another to wager that the internet and tools we use for navigating it are redefining what it means to read. But that is precisely the possibility worrying a growing number of writers and researchers. (2015: 160)

The new 'reading' amounts to skimming for information, is easily distracted by a hyperlink, and includes an increased use of digital image alongside text. Baron focuses on the loss of comprehension of sophisticated literary texts, like Jane Austen. But her attention to the damages done to any linear text more than two pages long is also cause for worry about the comprehension of philosophy texts: perhaps, once the reading habitus has been transformed, even those philosophy texts that are still offered on a paper surface will have become inaccessible. Philosophy simply will not give up her treasures to those who have

been habituated to skim for information. Reading philosophy is neither scavenger hunt nor shoe shopping. Some of the abstract ideas philosophy tries to engage are actually compromised by the use of image, with all of its rich and binding secondary properties of objects and empirical detail.

And in a reading state conditioned by interruption, we are especially vulnerable to the final unfreedom: the unfreedom of naïve or false belief in image contents. Plato worried about the images on the cave's walls. His worries are obviously salient in the age of doctored photos and virtual reality. But to the inattentive reader of news and social media, even an undoctored photo can be misleading. Consider, for example, some 2017 season photos of some players on a football team from the United States called the 'Philadelphia Eagles'.

In the United States, a protest movement against lethal police violence against black persons called 'Black Lives Matter' began in 2013 (Khan-Cullors 2018). More recently, the issue reached the national stage when a player named Colin Kaperneck began kneeling during the US national anthem in 2016 in order to draw attention to lethal police violence against black persons, particularly when some other footballers followed him in the protest (Branch 2017).

In the autumn season of 2017, three white members of the Philadelphia Eagles football team, including Zach Ertz, were photographed while kneeling on the field (Boren 2018). The Ertz photos were put on the air in late 2018, after the White House visit of the championship team had been cancelled.

The segment in which the Ertz photos aired initially implied that the kneeling Eagles were part of the protest movement. But later the station had to issue an apology:

> During our report about President Trump canceling the Philadelphia Eagles' trip to the White House to celebrate their Super Bowl win, we showed unrelated footage of players kneeling in prayer,' Christopher Wallace, executive producer of 'Fox News @ Night with Shannon Bream,' said in a statement sent to The Post. 'To clarify, no members of the team knelt in protest during the national anthem through the regular or postseason last year. We apologize for the error. (Boren 2018: 1)

We could construct an argument, no doubt interesting, about the symbolism of the act of kneeling. We could discuss the players' intent, conscious and unconscious: let us hope it was driven by righteous protest of some kind rather than simply being intercessory with respect to the coming game. None of it matters for the purpose of this argument. The one relevant issue is that the images themselves told the tale, even before Wallace had to.

Mandatory nationalism has telltale visual signs, and none of them are on display in the photos. The stands in the background are empty. An array of people, including officials, are both walking and sitting in the background. Their bodies face angles random from one another and are very clearly not coordinated by any kind of collective action, including by a united opposition against a prescribed

collective action. Their attention is directed at an array of things: that is to say, nowhere in particular. The setting is clearly not that of the national anthem.

However, in order to see this, you must slow down enough to look at the image with care. This is not our cultural habitus in the current human–screen interface. A reader skimming rapidly through text and images is neither a critical reader nor a critical looker. One wonders if even the photo researchers at work for the television station noticed as they made their way down the checklist: right sport, right body position, right team, right year. That the images would be used deliberately to dupe an audience is a dizzying prospect; that they would be used accidentally might be scarier still. The naïve watcher not only watches: increasingly, he or she also constructs images for others to watch, and does so out of his or her own naïveté, confirmation bias, and speed.

Screens and Freedom

But there is another side to the screen as a technological artifact, and the human–screen hybrid as a functional symbiosis. Freire argues:

> The inhumanity of the oppressors and revolutionary humanism both make use of science. But science and technology at the service of the former are used to reduce the oppressed to the status of 'things'; at the service of the latter, they are used to promote humanization. (2007: 133)

As Freire is aware, it is not always easy to distinguish oppressive from revolutionary uses of technology. The screen makes this distinction especially difficult. How can the cell phone and tablet screen promote humanization? And how can they do so, particularly in light of the concerns raised in the previous section: concerns about manipulation and prescribed purposes, consumerism, reading comprehension, fractured attention and multitasking, speed and naïve or false belief in image, text, and image/text combinations?

Wellner makes some suggestions about how the cell phone and tablet screens promote humanization. Her concept of multi-stability ably counters the issues of manipulation, prescribed purposes, and consumerism. I may use my cell phone to choose shoes or snacks: I may also use it to connect with the Black Lives Matter political platform as it was written, and not just as it is portrayed in the traditional media, or to look up how to do something to avoid a consumer act, like make homemade toothpaste, yogurt, or laundry detergent. In fact, Wellner argues, in comparison with television and film, digital technologies are much less subject to domination and selection by a small elite group (2016: 125). She writes, 'Digital technologies … enable much greater control and selection by all participants' (ibid.). The political freedom described here is a democratic one.

A simplistic narrative of loss also does not capture the complexity of the changes to human literacy that the cell phone and tablet screen enable: indeed, its poignancy is risky, since the nostalgia for the paper surface may occlude recognition of the transformative and liberating changes in our literacy enabled by screens. Readers can be trained to reflect on different types of reading practices, and then to choose, mindfully, from among different types of reading depending on their purposes (Keller 2014; Carillo 2016).

In light of this suggestion, we can interpret the decision to assemble the paper materials for this chapter in a new light, less revanchist than deliberate. One might choose to assemble materials on paper for high-level cognitive work, or only to read novels famed for their beautiful language on paper surfaces. This would not stop someone from seeking a phone or tablet surface for other kinds of reading. The daily international news cannot be accessed, swiftly, in any other way. An authentic video recording of an activist thwarting a deportation or a police action makes a compelling accompaniment to a news story. Mindfulness about the difference between kinds of reading surfaces raises our consciousness about reading practices. That is to say, the new surfaces highlight the category of literacy itself.

Wellner also proposes that there may be a potential freedom in the suspensions of attention that are negatively characterized as distraction. She writes, 'I prefer the term attention over distraction, because distraction presupposes a given level of attention that can be divided, whereas I conceive attention as flexible, liquid, and dynamic' (2016: 89). Wellner elaborates a wall-window metaphor to describe the screen's functioning (2016: 87–103). The freedoms of the screen's dynamic attention economy include the ability to wall off the self from aspects of lived reality—a move that can itself be liberating when this reality is oppressive, not so different from opening a paper book. But the freedoms are not only that of the wall, but also of the window, and include the ability to open windows between distant realities, between realities of different kinds, and between interlocutors of different kinds.

The dynamic model of attention also allows us to move, not entirely into the world of the screen, but actively between virtual and non-virtual worlds. Wellner points out that augmented reality, in which a user suspends her or his attention between the screen world and the non-screen world, is not the same as virtual reality, in which a user is wholly absorbed by the screen (2016: 71). The positioning technologies of our cell phone screens, especially, are designed for augmented rather than virtual reality. In this way, our screens may actually drive us ever-more deeply into our physical surroundings rather than away from them.

Finally, because one characteristic of the cell phone screen is its mobility, Wellner points out that, with comparison to the user of film or television, the cell phone screen user is much more active, physically and spatially (2016: 148–155). Mobility advances freedom, a theme to which I will return in the conclusion.

To Wellner's suggestions, I might also add that the epistemological drive of the cell phone screen user is strong, even when it is misguided. The value of

curiosity is assumed, and even amplified, by the capacities of the devices and the humans who carry them. Curiosity, as Hans Blumenberg has argued, may be the key value of the progressive elements in the Enlightenment's dialectic (1985). If a leading value had to be chosen to define the human–screen interface, curiosity would be a likely candidate.

The issue of naïve or false belief in the words and images on our screens is among the most salient of our time. At its best, the repeated lesson about doctored reality could serve as an explicit mechanism for delivering the philosophical truth, important since Plato, that reality is not always easy to discern, even or perhaps especially in one's perceptions.

Still, we ought to be wary of the extreme scepticism that could result from a critique of the screen's unfreedoms, were these pursued exclusively. The message not to believe any of what you see or hear is terribly pernicious, and it is a possible outcome of such an extreme scepticism. Absolutely any kind of authority can step into the gap left by this outcome.

In a very humorous analogy about the effects of authority on the truth, Galileo writes:

> One day I was at the home of a very famous doctor in Venice, where many persons came on account of their studies, and others occasionally came out of curiosity to see some anatomical dissection performed by a man who was truly no less learned than he was a careful and expert anatomist. It happened on this day that he was investigating the source and origin of the nerves … The anatomist showed that the great trunk of nerves, leaving the brain and passing through the nape, extended on down the spine and then branched out through the whole body, and that only a single strand as fine as a thread arrived at the heart. Turning to a gentleman whom he knew to be a Peripatetic philosopher, and on whose account he had been exhibiting and demonstrating everything with unusual care, he asked this man whether he was at last satisfied and convinced that the nerves originated in the brain and not in the heart. The philosopher, after considering for a while, answered: 'You have made me see this matter so plainly and palpably that if Aristotle's text were not contrary to it, stating clearly that the nerves originate in the heart, I should be forced to admit it to be true.' (1989: 63)

Here, the very mobility of our screens into the world of lived reality, rather than away from it, may be a crucial part of their ability to advance our freedom. Whatever the screen may say, it can be compared with a non-screen world in which it is immersed, and directly so. Images found on the screen, like those of the footballers, can be re-scrutinized to see if they actually show what the text beside them claims. Doctored images can be compared with originals, or things similar to them. A doctored image can even come to have a certain recognizable look: the look of propaganda.

Let us hope that we can metabolize the comparisons with more acumen than the Peripatetic.

Conclusion: Screens in the Classroom

We learn from Paulo Freire that the revolution is pedagogical (2007: 136). The classroom is a designated forum for practising dialogical action. Rather than banish the screen from the classroom, I suggest that we invite the screen in, in order to see what its capabilities are, and also to reveal its limitations.

The classroom itself has also always been both wall and window. As a designated space or grouping of persons, it is walled off from other spaces of social interaction, whether it has physical walls or not. The actions in classrooms are elaborated according to special discursive rules. As a window, the classroom can cause us to learn about something we did not know about, or to take a critical view on our own reality. Both functions could be either amplified or cancelled by screen use.

Philosophy has always been a freedom project. At its best, the philosophy classroom amplifies our freedoms, both in its content and in its forms. An excellent use of the phone and tablet screen, within its confines, is to ask students to reflect on examples of the elementary fallacies that they find within their own social media accounts, and to share those examples with their peers. This can turn a rather stodgy exercise of learning some Latin names and stock examples—*ad hominem*, *ad populum*, *ad misericordiam*—into an intensively personal investigation of the fallacies, their limits, why they are convincing and their operation in constructing aspects of the learner's reality. The screen, with its mobility and its ability to house the quasi-faces of the learner's friends, makes the exercise possible. But it can only do this if it is invited into the classroom in a revolutionary way. The screen cannot function thus if it is simply dismissed or excluded, as it is in almost no other space.

When you ask contemporary students to exclude their phones from their learning experiences, you are asking them to leave their bodies, minds and memories behind. And, in the end, suspended attention is not simply a feature of the device; it has been built into the student. You can no more demand that students abandon their habits of split attention than you can compel them not to daydream during a lecture. As ever, attention cannot be forced: it must be earned. What a liberating classroom space could do is educate about both the powers and limits of suspended attention, leaving students and teachers alike more able to choose its distribution mindfully.

The dispersion of attention may itself be liberating. In a 1933 essay, Georges Bataille reminds us that the etymological essence of fascism is uniting, concentration (1985: 149). In contrast, our screens give us the mobility and division we may need to maintain democratic life. The screen stands at attention to no single authority, still less a united religious and military one. Its distractions are also subversions, and perhaps the very condition of emancipation.

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CHAPTER 4

Facebook's Response to Its Democratic Discontents

Quality Initiatives, Ideology and Education's Role

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Introduction

From the mid-2000s to the mid-2010s, academic, journalistic and corporate rhetoric linked digital social media to democratic affordances that advanced the quality of public sphere communication by empowering users to voice their concerns, listen to others' views and engage in democratic debate with contesting positions on shared problems (e.g. Grossman 2006; Twist 2006; Shirky 2011; Gainous & Wagner 2013; Al-Jenaibi 2014; Hermida 2014; Bruns & Highfield 2016). However, there has been increasing concern and discontent in the last few years among a wide array of academics with the discourse of social media as a democratizing force advancing public sphere communication (e.g. Golumbia 2013; Allmer 2014; Fuchs 2014; Lovink 2016; Pasquale 2017; Sunstein 2017). This discontent has spread to digital media journalists and activists, and thereby to politicians, policymakers and publics at large throughout the world, after revelations of significant problems with the quality of social

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media content and engagement during and after the 2016 US presidential election, the Brexit vote and other less publicized (in the West) elections, such as the 2016 Philippine general election, as well as revelations of social media's association with sectarian violence in Myanmar and elsewhere (Cellan-Jones 2017; Faris et al. 2017; Reed & Kuchler 2018; Taub & Fisher 2018a; Taub & Fisher 2018b). These problems include sensationalist 'clickbait' linking readers to 'junk' news and advertising sites, hate speech and incitement of violence, trolling and harassment, flame wars, political bias in content ranking by algorithms and moderators, misinformation and conspiracy theories going viral, 'echo chamber' reinforcement and debate polarization, and targeted disinformation campaigns exploiting users' personal data (Deb et al. 2017; Faris et al. 2017; *The Economist* 2017; Bradshaw & Howard 2018; Fiegerman 2018; Reed & Kuchler 2018; Taub & Fisher 2018a; 2018b). In all, very serious questions have been raised, and much discontent expressed by academics, journalists, politicians and advertisers about the quality of social media communication vis-à-vis what is expected of democratic public sphere communication.

At the heart of the concern and discontent has been Facebook, which is not only the most dominant social media platform in terms of user attention, but has also been heavily implicated in much of the social media public sphere quality problems and associated discontent. As such, I take Facebook to be the key, if not the representative, case to begin any exploration of the discontents around social media and the public sphere.

Facebook's quality problems with respect to advancing democratic public sphere communication are now well documented and explored by journalists and academics (Tufeki 2016; Owen 2017; Pasquale 2017; PBS 2018; Pickard 2017; Batorski & Grzywińska 2018; Reed & Kuchler 2018; Taub & Fisher 2018a; Taub & Fisher 2018b). What has been less examined is Facebook's response to the public revelation of, and critical reactions to, these problems and the effectiveness of this response in addressing the problems. This response has taken the form of a public relations campaign, centred around an ongoing stream of announcements of what I am calling quality initiatives.[1] These initiatives purport to address, if not to totally fix, among other things, problems with the quality of public sphere-oriented communication made visible by Facebook.

Hence, a first question in this chapter will be: How has Facebook responded, since the 2016 US presidential elections, to its quality problems vis-à-vis quality public sphere communication? To answer this question, the second section of this chapter provides a summary of Facebook's quality initiatives for the two years between December 2016 and December 2018, that is, from just after the 2016 US presidential election, when media reports forced its CEO (Mark Zuckerberg) and management to publicly acknowledge that the platform had significant quality problems to deal with, until the time when I concluded research for this chapter. To develop the summary, I drew centrally from Facebook's 'newsroom' announcements, archived at newsroom.fb.com. I also referred to Facebook representatives' statements found within their Facebook page posts (mostly Zuckerberg's), interviews (e.g. Bickert & Zittrain 2018; Klein 2018;

Swisher 2018; Thompson 2018), conference speeches (e.g. Zuckerberg 2018e) and responses in official government hearings (e.g. Bickert 2018a; Facebook 2018; Sandberg 2018; Zuckerberg 2018c; 2018d). My summary is not a complete and detailed inventory of all of Facebook's quality initiatives, but rather a selective review of those initiatives that are directly of relevance to the quality of public sphere communication, although these do in fact account for the large majority of the quality initiatives announced during the past couple of years.

One important concern of many commentators, particularly those influenced by critical political economy analysis, which has *not* been explicitly or positively attended to by these initiatives is that the targeted-advertising revenue model adopted by Facebook to maximize profits (and growth) has a negative impact on the quality of communication with respect to the public sphere (Pickard 2017; Vaidhyanathan 2018). Hence, a second and a third research question follows: How precisely does Facebook's revenue model negatively impact the quality of communication as judged by public sphere norms? And, how do Facebook's quality initiatives attend to, if at all, this negative impact? In the third section of this chapter 'The Political Economy Problem and the Initiatives' Ideological Response?', I investigate these two questions. After outlining 'the political economy problem', including summarizing the negative impact of Facebook's revenue model on the quality of communication with respect to the public sphere, I highlight how Facebook's quality initiatives do in fact address the problem, but only in the negative sense of working to ideologically mask it.

The answers to the first three questions then lead, in combination with this book's theme, to a fourth and final question: What should be done in education to address Facebook's impoverishment of online public sphere communication via its targeted-advertising revenue model, and what should be education's response to the ideological masking by Facebook's initiatives of this impoverishment?

Before proceeding with the investigation of these questions, I need to clarify how the public sphere is conceived of in this chapter. I draw on a broadly Habermasian normative conception, given that it is most often assumed in digital media research and much democratic theory. Here, the public sphere is understood as a communicative space constituted by disagreement and debate over common problems, where the debate is ideally inclusive, informed, reflexive, reasoned, contestationary yet respectful, and free from state and market influence (Habermas 1989; 1992; 2006; Dahlberg 2018). Such communication enables the formation of critical publics—questioning, deliberative, self-reflexive—and associated public opinions that can hold formal decision-making processes democratically accountable (Habermas 1989; 1992; 2006).

Facebook's Quality Initiatives

This section provides a non-chronological summary of Facebook's quality initiatives that are directly relevant to public sphere communication and which were announced and initiated between December 2016 and December 2018.

I will organize the summary by following Facebook's pithy 'recipes' for 'cleaning up' its platform—'remove, reduce, inform' (Lyons 2018c) and 'amplify the good and mitigate the bad' (Zuckerberg 2018g)—although I will add 'detect' as one other key and distinct action of Facebook's quality initiatives that precedes 'remove', 'reduce', 'inform' and 'promote'. I thus start by discussing initiatives oriented to detecting and removing 'bad' actors and 'bad' communication from the platform. I then look at initiatives aimed at reducing the visibility of certain types of communication deemed not bad enough to be simply removed from the platform, and at associated measures to identify such communication. I subsequently describe actions aimed at enhancing the visibility of communication deemed by Facebook to be good quality. Finally, I summarize efforts aimed at informing users and other actors of any issues with the particular communications that they are engaging or associated with, and how they can deal with these communications.

First, one of Facebook's initial, and constantly reiterated, quality measures was to simply turn to its 'real name' rule and promise to more proactively and thus quickly block, disable or take down 'inauthentic' accounts, pages and groups (Stamos 2017; Sandberg 2018). This action against 'fake identities' is touted by Facebook as central in targeting and removing the accounts and communication of domestic and foreign political actors spreading, whether organically or through Facebook's targeted-advertising system, disinformation, polarizing propaganda and hate speech, as well as stopping economic actors using fake accounts for spamming purposes (Stamos 2017; Gleicher 2018; Sandberg 2018; Zuckerberg 2018c; 2018f).

Second, Facebook said it would increase its efforts in the proactive take down of any communication, even when coming from 'authentic' identities, that violates its Community Standards,[2] which are seen as, among other things, promoting civil and respectful communication on the platform (Zuckerberg 2017a; 2018f; Bickert 2018a). Facebook has also stated that it would more strictly enforce the removal from its platform of severe or repeat violators of its Community Standards (Facebook Newsroom 2018b; Gleicher 2018).

Third, and turning to detection efforts, in a well-publicized initiative to increase the identification of 'inauthentic' accounts and content violating Community Standards, and thus in support of the take downs promised in the two initiatives summarized above, Zuckerberg (2017b) committed to double the number of people working on 'safety and security'. This work includes everything from engineering technical systems so as to better identify fake accounts and terrorism threats to reviewing user and artificial intelligence (AI) flagged content[3] for violations of Facebook's Community Standards (Bickert 2018a; Silver 2018). By mid-2018, Facebook claimed to have fulfilled this promise by taking the number of people working in these areas from 10,000 to over 20,000 (Sandberg 2018), and by the end of 2018 Zuckerberg (2018f) announced that this number had been increased to 30,000, of which 15,000 were content reviewers based globally (Bickert & Zittrain 2018).

Fourth, furthering its detection actions, Facebook placed AI—including machine learning and computer vision—at the centre of its strategy to not only proactively identify fake accounts and violations of community standards, but to predict the existence on its platform of other types of low-quality communication such as clickbait and misinformation, whose subsequent demotion in visibility will be discussed in the next initiative (Facebook Newsroom 2018a; Gleicher 2018; Lyons 2018a; Sandberg 2018; Thompson 2018; Zuckerberg 2018c). Facebook says it is now detecting such low-quality forms of communication not only in text, but increasingly in photos and video, by using technologies like optical character recognition (Lyons 2018b; Woodford 2018).

Fifth, and turning now specifically to demotion rather than take-down actions, Facebook announced, 'in an effort to support an informed community' and in line with providing 'authentic communication', an increased effort to reduce the visibility of financially driven 'clickbait' (Babu et al. 2017). Clickbait here refers to posts that contain provocative headlines and visuals designed to seduce users into clicking on hyperlinks that lead to advertisement-filled websites outside Facebook that only provide 'low-quality'—and sometimes 'false' or 'hoax'—news and information (Babu et al. 2017; Mosseri 2017). According to Facebook's spokespeople, clickbait is identified with the help of machine learning and demoted algorithmically in user News Feeds, undermining its visibility and subsequent spread and thus the advertising money received, thereby disincentivizing its production and publication (Babu et al. 2017; Facebook 2018; Sandberg 2018; Zuckerberg 2018c). In addition, Facebook announced that it would—in the name of a 'more informative' experience—be lowering the visibility of any post, not just those using clickbait, that links to a 'low-quality web page experience' outside of Facebook, in other words, that links to a web page which is 'low in substantive content' and high in 'disruptive, shocking and malicious ads' (Lin & Guo 2017). It needs to be noted that this initiative applies to organic posts and not to advertising. Advertising on Facebook that links users to sites with 'low-quality web page experience' outside the platform is to be simply blocked rather than demoted in visibility (Lin & Guo 2017).

Sixth, to aid the detection of misinformation, and as one of its first responses to charges of spreading 'fake news' on its platform during the 2016 US presidential election, Facebook started a third-party fact-checking programme. By April 2019, Facebook was 'partnering' with 52 'independent' fact-checkers in 33 countries (Funke 2019b). 'Partners' such as Factcheck.org review and rate the accuracy of articles, photos and videos posted on Facebook that have been predicted to be false by a machine-learning classifier (Mosseri 2016a; Zuckerberg 2016; Zuckerberg 2017a; Facebook Newsroom 2018a). Facebook says that it then significantly reduces the visibility on News Feed of stories that are 'rated as false', cutting future 'views' by on average of more than 80 per cent (Lyons 2018a; see also Sandberg 2018; Zuckerberg 2018c). Facebook also announced

that it would be using these ratings to take action against actors who repeatedly get 'false' ratings on content they share, de-prioritizing their content and removing advertising and monetization rights (Shukla & Lyons 2017; Stamos 2017; Lyons 2018c). Moreover, Facebook stated that it would disallow advertisers from running 'ads that link to stories that have been marked false by third-party fact-checking organizations' (Shukla & Lyons 2017).

Seventh, continuing to expand its outsourcing of misinformation detection, Facebook turned to its users not only to report what they believe to be violations of its Community Standards (e.g. harassment, hate speech and nudity), as it has done for a number of years, but also to flag what they believe to be false news stories (Facebook Newsroom 2018a). This user reporting is fed, along with many other signals, into a machine-learning classifier, as mentioned above, that predicts dubious stories for third-party fact-checkers to then assess the veracity of (Facebook Newsroom 2018a). Facebook is now also checking user comments on stories for signals of false news, for example 'phrases that indicate readers don't believe the content is true' (Facebook Newsroom 2018a).

Eighth, to support user judgment of the veracity of news articles, in early 2018, Facebook launched (starting in the United States) a 'news context' initiative to provide various types of contextual information (where available) on the news stories that it spreads (Hughes et al. 2018; Smith et al. 2018). A 'context button' enables this feature, which is to be rolled out globally from the end of 2018 (Hughes et al. 2018). The contextual information provided varies depending on what is available for an article, but the possibilities include: a list of links to 'related articles', a description of the publisher that includes links (where available) to the publisher's Wikipedia page and to other articles posted by the publisher, any fact-checking reviews available on the story, and information about how much the article has been shared on Facebook, where it has been shared and which of one's 'friends' have shared the article (Hughes et al. 2018; Smith et al. 2018). In addition, users about to share an article, or who have shared the article, are warned via a pop-up notification if an article's claims have been disputed by a fact-checker assessment (Smith et al. 2018; Zigmond 2018). This initiative is likely to evolve and the specific information provided change, but the general goal will remain, which is not only to inform, but also to 'empower' users in coming to their own individual decisions about the 'credibility' and 'accuracy' of the news they see (Smith et al. 2018), and hence 'empower' users in making 'smart choices' (Simo 2017) about 'what news to read, trust, and share' (Zigmond 2018). Thus, showing the context of stories can also be conceived as 'helping people sharpen their social media literacy' (Chakrabarti 2018), which leads us to the next 'inform'-related initiative.

Ninth, Facebook launched a global 'news literacy campaign' after the 2016 elections, with various 'updates' since, to further 'empower' users to judge for themselves the quality (including veracity) of content that the intermediary, and others, makes visible to them (Hegeman 2018; Zigmond 2018). This news

literacy campaign, in partnership with third-party (digital) news literacy organizations such as the News Literacy Trust in the United Kingdom (Bickert 2018a), started by providing users with 'tips'[4] to recognize false or misleading news and information. These 'tips' have been publicized not only online, but also through mass media and other offline advertising, particularly around national elections, for example around the 2017 UK national parliamentary elections (BBC 2017). The news literacy initiative has expanded into education in schools: for example, Monika Bickert (2018a), Facebook's head of global policy management, reported to a British parliamentary hearing on 'fake news' that Facebook has 'digital ambassadors in schools talking about, among other things, how to recognize false news'. And on 2 August 2018, Facebook announced the launch of its 'Digital Literacy Library, a collection of lessons to help young people think critically and share thoughtfully online' (Davis & Nain 2018).

Tenth, under sustained pressure from a range of governments about the use of Facebook's targeted-advertising system for damaging democratic discourse around elections, in May 2018 Facebook announced (for the United States at first and then for the United Kingdom, Brazil and India by the end of 2018) a 'political' advertising transparency initiative in line with its initiatives to 'inform' and thus 'empower' users and other actors (Leathern 2018). This initiative pre-empts, as Zuckerberg declared during Senate hearings on 10 April 2018, the digital political advertising 'transparency' rules under development by UK and European Parliament and US Congress. Facebook announced that the initiative would make 'political' advertising more transparent by: identifying as 'Political Ad' those advertisements deemed to be running 'electoral' or 'issue-based' content (Goldman & Himmel 2018); disclosing to viewers via a 'paid for by' label on the political advertisement who paid for it (Chakrabarti 2018; Leathern 2018); making available, through the 'paid for by' label, a searchable archive with further information on any 'political' advertisement, information such as 'the campaign budget associated with an individual ad and how many people saw it—including their age, location and gender' (Leathern 2018); and 'making it possible to see on any advertiser's page any (not just "political") advertisements they're currently running' (Chakrabarti 2018; also see Goldman & Himmel 2018). In March 2019, Facebook announced that this transparency initiative would be expanded to all advertisements (Shukla 2019).

Eleventh, in terms of action to 'promote' the 'good', complementing actions already discussed to delete or demote the 'bad', in early 2018, Facebook announced two major updates to the elements Facebook positively values in its News Feed algorithmic ranking of 'high quality' communication, which is one factor that determines the visibility of a story with respect to any particular user. The first major update was to add value and thus visibility to 'meaningful' social interaction or 'engagement' (such as comments, shares, reactions and time spent on posts) between 'friends-and-family' in contrast to 'public content' from brands, including from news organizations (Mosseri 2018a; Zuckerberg 2018b). The visibility of branded news content, while being overall

reduced in News Feeds, was to be advanced when stimulating such friends and family 'engagement' (Mosseri 2018a). The second major update aimed at ensuring 'News Feed promotes high quality news' was to 'prioritize news that is trustworthy, informative, and local' (Zuckerberg 2018a). 'Trustworthy' and 'personally informative' news have long been valued in the News Feed as being of high quality (Kacholia 2013), but these elements are now being further emphasized: more value and thus more visibility is being given to news that is reported by users as coming from user-ranked 'broadly trusted sources' (Mosseri 2018b; Zuckerberg 2018a) and to news that is 'personally informative', which, as with 'trusted sources', comes from user 'quality survey' feedback (Mosseri 2016b; Xu, Lada & Kant 2016; Mosseri 2018b). The boosting of the visibility of 'local' news with respect to a particular user—news that is deemed to be of high quality because assumed to be more relevant, informative and community-oriented—was enacted first in the United States in January 2018, but has since March 2018, according to Facebook, been expanded globally (Hardiman & Brown 2018; Mosseri 2018b). This boosting of local news visibility responds to the great concern expressed for a number of years now by journalists, activists and academics, about the devastation of local reportage and readership with attention and advertising turning to digital platforms, particularly to Facebook (Bell & Owen 2017).

The twelfth and final Facebook quality initiative that I will summarize is the 'Facebook Journalism Project' (FJP). Announced by Facebook in early January 2017, FJP clearly responds to both the discontent about the content amplified by Facebook during the 2016 US presidential election and to the concerns expressed over a number of years, as noted at the end of the previous initiative's summary, that Facebook negatively impacts on quality journalism. FJP, according to its launch announcement, is to operate as a 'hub' for all of Facebook's 'efforts to promote and support journalism on Facebook' (Simo 2017). As such, FJP incorporates some of the actions discussed in other initiatives, including those boosting local journalism, discouraging misinformation, promoting trustworthy and personally informative news, and advancing digital news literacy. As with a number of the other quality initiatives, FJP contains a package of sub-initiatives that are being added to with time.[5] FJP's remit centrally includes raising the quality of, and the trust in, journalism, as well as improving news literacy among readers. FJP's advertised aim is to work with media partners to create new products, provide (largely Facebook) tools and training for journalists to effectively use Facebook for news gathering and storytelling, and help 'give people information so they can make smart choices about the news they read' (Simo 2017). It does not matter that the details of the project and its subprojects cannot be discussed here due to space limitations. What is important to note is that the claim of the FJP is to improve the quality of news and news literacy, which will then (purportedly) have a positive impact on the quality of news seen by Facebook users and upon their news literacy.

The Political Economy Problem and the Initiatives' Ideological Response

While it is too soon to assess the success of the initiatives, initial academic and journalistic research and analysis associated with these points to ongoing quality issues with Facebook communication in relation to public sphere ideals. These quality issues include: lack of transparency about algorithmic ranking and take-down decisions; failure to deal with echo-chambers and group polarization; bias in algorithmic curating and third-party fact-checking; and limited effectiveness in dealing with false news, conspiracy theories and hate speech (Fiegerman 2018; Fisher 2018; Gillespie 2018; Guess et al. 2018; Koebler & Cox 2018; Levin 2018; Reed & Kuchler 2018; Taub & Fisher 2018a; Taub & Fisher 2018b).

In contrast, Facebook reports from its own metrics and research evidence that the initiatives are already having success. For example, as seen in initiatives one and six above, Facebook reports blocking millions of attempts to register fake accounts every day and reducing the reach of news rated as false by fact-checkers by 'on average 80%'. The numbers that Facebook regularly cites with respect to its actions against low-quality communication, especially in its public relations rebuttals of critical media reportage, are often very impressive in themselves. For example, Nathaniel Gleicher (2018), Facebook's Head of Cybersecurity Policy, reports that 'we took down 837 million pieces of spam and 2.5 million pieces of hate speech and disabled 583 million fake accounts globally in the first quarter of 2018'. These numbers are not independently verified, and the 80 per cent visibility demotion of news rated as false, which has been constantly heard from Facebook representatives since early 2018, has been questioned by one of Facebook's own fact-checking partners, Snopes (O'Brien 2018).[6] However, there *is* some 'independent' evidence from academic and journalist research, which Facebook public relations eagerly reports, of some early success for Facebook's quality initiatives, particularly reduction of the diffusion of misinformation (e.g. Allcott et al. 2018; Resnick et al. 2018; Guess et al. 2019; Pennycook & Rand 2019). And media producers themselves, including 'junk news' producers, report some quality-advancing effects resulting from Facebook implementing its recent initiatives (O'Brien 2018).

Moreover, Facebook makes out that it is not only willing and able to address all its quality problems, but that it can also be trusted to be open about the process, including by admitting difficulties and even errors along the way. Facebook's CEO Mark Zuckerberg and other spokespeople talk of the enormity, complexity and challenge of the task, and that it will take time to address the problems, and in fact that this addressing will be ongoing since new and unforeseen problems will arise (Sandberg 2018; Zuckerberg 2018c; Zuckerberg 2018d; Zuckerberg 2018f). Indeed, Facebook spokespeople have stated that there are 'limits' (Lyons 2018a) to what is possible to moderate for due to the 'operational

constraints' of 'a system this size' (Bickert in Bickert & Zittrain 2018). Facebook has, moreover, performed with integrity by announcing the existence of errors in its quality processes that need to be attended to, admitting, for instance, to a 10 per cent error in its content reviewer checks (Zuckerberg 2018f).

Furthermore, Facebook regularly announces new or revamped quality initiatives in response to any new quality problems and to those errors that it admits to making. For example, it recently announced that it was expanding its appeals process in response to mistakes in take-downs resulting from content reviews (Bickert 2018b). As Bickert (cited in Bickert & Zittrain 2018) explains, 'at our scale, with more than 2 billion people and millions of reports coming in, we are not going to get it right every time, so that is why we have now built out appeals … which will be expanded [during 2019 and 2020] to all policy violations' and will 'help us find mistakes that we are making, and improve our technology, review process, and policies'. Hence, Facebook *seems* to be attending to, as far as it can, all its quality problems.

However, there is a fundamental 'political economy' problem impeding the advancement of quality public sphere communication through Facebook, a problem which has been pointed to for some time by political economy-informed commentators (Owen 2017; Pickard 2017; Tufeki 2016; Vaidhyanathan 2018), but which the platform's quality initiatives *seem* to avoid addressing, despite their apparent comprehensibility. This problem is, to sum it up in one sentence, that Facebook's profit-driven targeted-advertising revenue model has a generally negative impact on the quality of communication as judged by typical public sphere normative standards. In what follows, I will first tease out the logic of this political economy problem, thus answering the second research question specified in this chapter's introduction, which asks how precisely Facebook's revenue model negatively impacts the quality of communication as judged by public sphere norms. I subsequently respond to the third question, which asks how, if at all, Facebook's quality initiatives attend to the political economy problem.

The targeted-advertising revenue model adopted by Facebook to secure maximum profit demands maximizing the production and collection of user data by, in turn, maximizing the production of user 'engagement', which is defined and operationalized in the platform as 'data producing user actions'. Such 'engagement' is in turn advanced by the configuring of all communication on the platform so as to make most visible to each user the communication that they are most likely to 'engage' with, which is predicted from the behavioural data gathered on each user. This configuring of communication, with its consequent incentivizing of particular content production and publication, is achieved by Facebook's various visibility control mechanisms, most notably its News Feed algorithms, but also its interface design and range of notifications and other prompts.

The type of communication that research shows is most readily 'engaged' with, and thus that is systematically made visible by the Facebook platform, is on the

whole compromising of public-sphere-defined quality communication, even when taking into account the effects of the quality initiatives (Owen 2017; Guess et al. 2018; Vaidhyanathan 2018). Advertising also negatively impacts the quality of public sphere communications, as recognized by public sphere theory (asserting the need for autonomy from market influence) and critical political economy influenced communication scholars, but *not* recognized by many other media commentators. The types of poor quality public sphere communication amplified by 'engagement' maximizing and targeted advertising can be classified for heuristic purposes in terms of the (public sphere-judged) quality of content and the (public sphere-judged) quality of interaction, as I will now quickly do.

With respect to the public sphere-judged quality of *content*, Facebook's 'engagement' maximizing-targeted advertising system tends to amplify content, for any particular user that: is personally oriented, in contrast to being publicly oriented content that broaches contentious issues of common concern; targets an individual user's own particular point of view and identity, rather than confronting users with contrasting views, and is thus reinforcing of echo-chambers and confirmation bias; is easily consumed (e.g. memes), not demanding thought and self-reflection; is commercially oriented, through paid-for content; is emotional-reaction-inducing in contrast to fostering reasoned consideration;[7] is dogmatic rather than open; and is self-promoting rather than publicly oriented (Batorski & Grzywińska 2018; Guess et al. 2018; Vaidhyanathan 2018; Hoffmann, Taylor & Bradshaw 2019). Of course, these 'low quality' elements are only evaluated as such as the result of applying public sphere norms, and would be evaluated otherwise if applying norms of, say, strategic communication or personal welfare. But the public sphere is the focus here with respect to Facebook's claims to be a democratizing medium.

With respect to the public sphere-judged quality of *interaction*, despite the emphasis through quality initiative eleven on amplifying 'meaningful' interaction, interactions are still systematically understood in terms of 'engagement', which is defined and operationalized through the platform's technology as 'data producing user actions', which means those discrete and quantifiable 'actions' of individual users. This non-deliberative understanding of engagement is systematically designed into the platform through a range of buttons, including 'reaction' (which explicitly equates engagement with non-deliberative action), 'share', 'comment', 'confirm friend', 'hide post' and 'report' buttons. These and other buttons not only enable data-producing actions, but also ensure the perpetuation of such (inter-)actions by feeding users dopamine hits via displaying on a user's interface the number of 'reactions' to, and comments on, their posts (Hwang et al. 2018). As such, Facebook engagement constitutes subjects not as deliberative publics, but as Pavlovian individuals, as stimulus-response conditioned actors. Advertising, in turn, works to produce similar types of non-deliberative interaction and subjects.

Facebook architecture is in fact, as Vaidhyanathan (in Glaser & Oremus 2018) argues, drawing from his rigorous political economy analysis of the platform

(see Vaidhyanathan 2018), 'terrible for deliberation' even if 'good for organization (like the Arab Spring)'. Despite political discussion having gravitated to the platform, its interface is 'not designed well for people to interact with each other in a respectful, responsible way, to keep a line of argument going, [and] to be able to respond to nuances in a line of argument' (Vaidhyanathan, in Glaser & Oremus 2018). This lack of attention to deliberation and focus on individual actions is clearly seen in the architecture of Facebook's comment section below posts that offers the most obvious place where publicly oriented user-to-user interaction might be found on the platform. Even when articles initially shared are of 'high quality', the structure of the comments space means that users tend to only see, and thus respond or react to, the last comment made, and thus any *reason*-able comments quickly get lost. Hence, on Facebook, in-depth arguments are systematically ruled out, and instead of 'deep conversation', we find 'cacophony' (Vaidhyanathan, in Glaser & Oremus 2018; see also Vaidhyanathan 2018).

As well as driving low-quality types of content and interaction, as judged against public sphere norms, 'engagement' maximizing and advertising consumption undermine public sphere communication by driving inequalities of participation—some voices will be systematically favoured over others to the degree that they engender 'engagement' and/or pay for visibility. This is in contrast to the ideal of an inclusive public sphere.

We can conclude that, while Facebook argues that it values quality/democracy-advancing communication and is promoting such through its platform (particularly via its new quality initiatives), the platform continues to amplify much low-quality public sphere communication both by rewarding with visibility the types of content that stimulate 'engagement' and by displaying hyper-personalized advertising. The quality initiatives may have a moderating effect on poor quality communication—when not themselves exacerbating it (as the friends-and-family interaction measure summarized in initiative eleven may be doing by amplifying the visibility of sensationalist, privatized and echo-chamber communication). But, overall, the 'engagement' and targeted-advertising maximizing imperatives—which have not been altered by the quality initiatives—will tend to drive down quality as understood by public sphere norms. This conclusion clearly parallels Habermas' (1989; 2006) argument that a media revenue model that relies on advertising will drive down the quality of communication in the public sphere not only by contaminating public sphere communication with the strategic communication of marketing, but also by being dependent on maximizing distribution so as to maximize attention to this marketing. The idea here is that there is a fundamental contradiction between a profit-driven advertising revenue model and advancing quality public sphere communication. This contradiction is only exacerbated when this revenue model becomes a data-reliant, hyper-personalized marketing system that demands ever more 'engagement' and targets advertisements ever more seductively. As such, democratic discontent with Facebook and corporate social media is well founded.

The political economy problem discussed above has been raised not only by academic critics (as referenced above), but also increasingly by journalists (e.g. Klein 2018; PBS 2018; Swisher 2018), and, most worryingly for Facebook, by politicians and regulators (e.g. Facebook 2018; Sandberg 2018; Zuckerberg 2018c; Zuckerberg 2018d). Hence the third research question asked in the introduction: how do Facebook's quality initiatives attend to, if at all, the political economy problem—the negative impact of Facebook's profit-driven targeted-advertising revenue model on the quality of public sphere communication?

As noted above, Facebook's quality initiatives do not *seem* to attend to the platform's political economy problem at all. This is because the initiatives do not openly or positively respond to the problem in the sense of performing any amendments to Facebook's revenue model so as to reduce, if not eliminate, the platform's negative impact on quality public sphere communication. However, the initiatives do in fact strongly attend, or at least react, to the political economy problem in an *ideological* way: Facebook's quality initiatives, through their very performance of addressing the quality issues, work to 'fix' the negative relation between the platform's revenue model and quality public sphere communication by attempting to simply make this impact disappear. How do Facebook's initiatives work to enact such disappearing? The remainder of this section will consider four general ways in which they do so.

First, Facebook's impressive array and seemingly constant stream of announcements of quality initiatives—announcements that are accompanied by a combination of technical details from managers and idealistic rhetoric from CEO Zuckerberg—suggests that Facebook is exploring all possible solutions to, and hence causes of, the quality problems, a suggestion which conceals the negative impact of the targeted-advertising model on public sphere communication.

Second, by promising to amplify 'good' communication and to eliminate or demote 'bad' communication, the initiatives suggest that what will be most visible to Facebook users is quality communication, thus indicating compatibility between the communications that Facebook's targeted-advertising system then makes visible and quality (including public sphere) communication. However, the version of 'quality' articulated by Facebook's initiatives' naming of 'good' and 'bad' communication leaves aside, and indeed obscures, some normative elements that are generally considered in public sphere theory to be central to any public sphere conception, including, reasoning, reflexivity, respectful contestation between different positions and autonomy from commercial (including advertising) influence. These left out and obscured elements, as it so happens, do not tend to be supported, and are in fact often undermined, by Facebook's targeted-advertising revenue model. As such, the exclusion and obscuring here operate ideologically by enabling identity between Facebook's communication and (a very questionable conception of) quality public sphere communication.

Third, the naming and attempted elimination of not only 'bad' communication but also associated 'bad' (undemocratic) actors external to Facebook's

system—foreign political propagandists, trolls, clickbait advertisers, rogue developers, fake account holders and hate-speech peddlers—positions the corporation as a 'good' actor protecting democratic communication from outside threats. This positioning will be ongoing because, as Facebook's spokespeople (e.g. Leathern 2018; Zuckerberg 2018g) repeatedly emphasize and thus clearly want us to know, quality problems will persist since Facebook is up against 'smart, creative, and well-funded adversaries who change their tactics as we spot abuse' (Leathern 2018), which requires Facebook, as a good actor, to constantly develop new and/or updated quality initiatives. This naming of the perpetrators of bad communications, and the associated positioning of Facebook and its communications as good, obscures how the platform's own system tends to drive the quality of public sphere communication lower.

Fourth, turning to Facebook's relation to its users, the quality initiatives' enactment of Facebook as a democratic actor is reinforced by the enlisting of users—along with independent third parties like fact-checkers—in aspects of content moderation, including in reporting 'bad' content, in ranking trustworthy sources and in responding to surveys on what they see as informative news (see summaries of initiatives seven and eleven in 'Facebook's Quality Initiatives', above). This enlisting is promoted as democratically 'empowering' users (Zuckerberg 2017a; Zigmond 2018), which works to obscure Facebook's ultimate power and systematic shaping of the form and visibility of its users' communication towards maximizing 'engagement' and target advertising, and thus to obscure the platform's negative impact on public sphere quality. Users are further positioned as empowered by initiatives offering them some, largely token, control over the content they see (e.g. more control over which 'friends' they do and do not wish to see posts from) and 'allowing' them to be their own judge of the value, including the veracity, of the information fed to them. Moreover, as seen in initiatives eight and nine, Facebook suggests that it is empowering users in such judgment by providing contextual information on news articles and by supporting 'news literacy'. Facebook gives users (and other actors),[8] according to Bickert (2018a), the ability to make responsible choices with respect to communication on the platform. Facebook's various quality initiatives, asserts Facebook's director of News Feed analytics Dan Zigmond (2018), work to 'empower people to decide for themselves what to read, trust, and share'. This rhetoric promotes a liberal-individualist subject that simply needs to be informed and up-skilled so as to make rational decisions for themselves in relation to judging and contributing to Facebook's communication. However, this liberal-individualist subject is not a deliberative and public-oriented subject able to advance democracy, and neither does this subject follow from, but rather conceals, the way in which users are actually constituted, as already noted, by the platform as Pavlovian (stimulus-response) subjects.

In these ways, the quality initiatives work to obscure the negative impact of Facebook's targeted-advertising revenue model on the quality of public sphere communication and to protect Zuckerberg's and shareholder interests

(in profit and growth) from user, journalist, developer, advertiser and legislator discontents and critiques, which would likely lead to actions—particularly user and advertiser withdrawal and regulations—that would negatively impact the maximization of profit and growth. Up until now, this obscuring has not been wholly successful, as indicated by the ongoing discontent with Facebook. But new quality initiatives continue to be rolled out, and with time they may succeed, in combination with Facebook's general public relations and political lobbying, to more fully conceal the political economy problem.

Considering Education's Role

Facebook has responded to discontents with the quality of online public sphere communication on its platform primarily by way of producing a stream of quality initiative announcements and implementations, as outlined in 'Facebook's Quality Initiatives', above. These initiatives are likely to have some positive impact on Facebook communication vis-à-vis the constitution of public spheres, broadly conceived. However, the initiatives do not fundamentally challenge Facebook's targeted-advertising revenue model that has been shown, on the whole, to encourage low-quality public sphere communication. Rather, the initiatives generally work in unison with the revenue model: the initiatives promise to largely cleanse the platform of many of the most easily identified anti-democratic forms of communication plaguing it, which are often also attention, 'engagement' and advertising undermining forms—for example, terror content, hate speech, foreign propaganda, spam, disinformation—while overlooking the massive amount of less obviously poor-quality public sphere communication that is advanced by the platform's engagement maximizing and targeted-advertising revenue model. This negative impact of the model on quality public sphere communication is obscured, rather than positively attended to, by the initiative's promise and performance of cleansing the communication. Through this obscuring, and other disappearing acts outlined in the previous section, Facebook's quality initiatives ideologically respond—in concert with Facebook's other public relations and political lobbying work—to the growing concerns and discontents with the platform's revenue model.

This brings us to the fourth and final question asked in the introduction: what should be done in education to address Facebook's (and other profit-driven targeted-advertising platforms') impoverishment of online public sphere communication, and what should be education's response to the ideological masking by Facebook's initiatives of this impoverishment? Any education-oriented 'solution' to Facebook's quality problems that does not critically address the impact of the platform's revenue model is not only insulting to users, but itself acts ideologically by masking such impact. By critically addressing, I mean no less than working towards the democratization of the platform by identifying, politicizing (contextualizing) and normatively evaluating the values,

interests, logics and decisions behind the platform's technological affordances. The democratization of Facebook would be most fully achieved by turning it into a non-profit, democratically owned and thus controlled entity (such as a public service social media). However, taking social democratic ownership of the platform is highly unlikely in the current political climate. More feasible democratization moves, while still politically difficult to accomplish, include a combination of: breaking up the company; regulating to make it accountable to citizens; instituting data transferability and interoperability rules that ensure that users can easily shift to democratic platforms; and financially assisting the development of such democratic platforms, as well as investigative journalism by applying a rentier tax to Facebook and other for-profit platforms, given that they profit from content that they do not produce or pay for. I cannot explore these and other democratizing options here.[9] I will focus instead on what role 'digital literacy' and education in general can have in relation to such democratization.

In relation to the democratization of digital social media, education needs to, first and foremost, enable student learning about, and interrogation of, the political economy and associated ideological work of the platforms, and how this relates to the political economy and ideology of technology and societies more generally. Education is conceived here as public sphere constituting,[10] providing space for the interrogation and debate of social problems, including that of Facebook's and other social media corporations' democratic deficits. While this 'critical' social media education is desperately needed in terms of helping to advance the public sphere and democracy through social media, it is also what Facebook and other profit-maximizing social media corporations will be trying to ensure that people do not get, or even know that is needed. As we have seen, Facebook acts to conceal such systemically focused digital literacy by framing and promoting digital literacy as being about informing and giving tools to individual users to enable them to make good 'choices'. Informing here is understood by Facebook to be enabled through the wealth of voices that the platform networks, and in terms of the quality initiatives, facilitated by the provision of contextual information on news. And the tools provided by Facebook for the making of 'choices' include those that enable individual users to change settings so that they can (somewhat) modify their visibility of, and to, other users (Facebook does not, needless to say, refer to the visibility and subsequent informing that itself, its clients and its developers gain through surveillance of nearly everything users do on the platform, and even beyond it).

The liberal-individualist (rational choosing individual) and largely privatized (self-interested) subject articulated in this framing of digital literacy—which many actors beside Facebook promote—obscures not only Facebook and similar platforms' actual systemic constitution of users as Pavlovian (stimulus-response) subjects, as noted in the previous section, but also the need for, and possibility of, critical and democracy-enhancing social media literacy. Critical education must expose this ideological work, while at the same time acknowledging the

dialectical potentiality for democracy of the proliferation of voices and the distribution of information on Facebook's and other corporate platforms.

In thinking about critical social media education with respect to discontents and concerns about Facebook's relationship to public sphere norms, I have specifically focused on the impact of the platform's political economy and associated ideology. But a general conception of critical digital education is not reducible to political economy and ideology critique. Critical digital education includes any approach that involves not only describing but also politicizing and normatively judging technological systems and their values, interests, meanings, logics, affordances, applications, user interpretations, uses and social impacts.[11] By politicizing, I mean illuminating the social and historical contextuality and thus contingency of social phenomena, and hence de-naturalizing—showing how they are based on power relations and political decisions, and that they *could* be otherwise. By normatively judging, I mean applying politically founded (and thus always revisable) norms such as the public sphere conception to evaluate social phenomena and highlight how they *should* be otherwise. Hence, critical social media education should include, for example, Internet history, which is essential for contextualization. Also useful is critical platform studies, which highlights and interrogates not only the technological logics and architecture shaping use, but also the political decisions and values embedded within these logics and architectures. In addition, political and ethical studies are needed for fostering normative judgment capabilities. And critical ethnography, psychology and sociology are also useful for students in exploring and interrogating users' social media interpretations, desires and drives, attachments and adaptations (of themselves and of the technology), and in helping to think how users might actively and collectively resist their subjectification.

Central here is shifting the focus of the role of digital education from being about supporting individual choices and interests to fostering critical thinking and debating subjects who can see and engage with their world and technology not as given, but as socially shaped, and thus as being open to being shaped otherwise. In other words, I'm calling here on a vision where digital education is seen as providing the foundations for students not only to participate in contextual and normative investigations of digital platforms, but also, more broadly, to help constitute public debates, and subsequently public opinions that can feed into democratic activism and politics, around social media's role with respect to shaping communication, subjects, politics and society at large.

Notes

[1] In support of its public relations campaign, Facebook also increased its political lobbying efforts (Frenkel et al. 2018).

[2] Facebook's Community Standards spell out what content and interaction is, and is not, allowed on the platform, including public sphere undermining

hate speech, bullying, harassment and the promotion of offline violence (Bickert 2018b). See, as at February 2018, https://www.facebook.com/communitystandards/

[3] Facebook is able to quickly ramp up the number of its reviewers without major impact on profits given that many of them are outsourced contract workers, often employed in cheap labour markets, including the Philippines and India (Gillespie 2018).

[4] See Facebook Help Centre at https://www.facebook.com/help/188118808357379

[5] Updates of all Facebook Journalism Project's sub-initiatives can be found at https://www.facebook.com/facebookmedia/solutions/facebook-journalism-project

[6] Snopes withdrew from its fact-checking work for Facebook at the end of 2018 after expressing frustration with the platform's expectations, particularly around the lack of support Facebook was providing for this work (Funke 2019a).

[7] Emotions are essential to public sphere communication, but not emotional reaction bereft of reasoned reflection.

[8] Bickert (2018a), for example, stated, when representing Facebook before a British parliamentary hearing into 'fake news', that 'we are trying to improve the ability of the broader community, meaning not just users but journalists, policymakers, educators, parents, to fight false news by recognizing it, distinguishing among news sources, and being able to make responsible choices'.

[9] For more on democratizing Facebook, see Fuchs (2014), Pickard (2017; 2018) and Tarnoff (2019), and for activism in this direction, see the Freedom from Facebook initiative at https://freedomfromfb.com/

[10] While education should be considered as public sphere constituting, the public sphere and its media systems can be conceived as fostering critical learning and the constitution (education) of publicly oriented democratic subjects.

[11] For further on the type of critical analysis that I envisage, see Glynos & Howarth (2007).

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CHAPTER 5

The Quantified Self and the Digital Making of the Subject

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Introduction

The Quantified Self website, created in 2008 by two *Wired* magazine editors, Gary Wolf and Kevin Kelly, instigated a movement for the better understanding of the self, based on numbers (Lupton 2014). The site has indeed as its slogan: 'self-knowledge through numbers'.[1] Such a self-knowledge was promoted by the manual collection of numbers on one's body functioning, which were analysed thanks to tools of analysis offered in the site. The founders also encouraged the construction of communities where people would share their calculation and insights with others, thus helping each other to get a better understanding of their quantified bodies.

More recently, 'wearable fitness technology', as sensors directly connected to the body that continuously collect data (Gilmore 2016), have been coupled with smartphone applications that perform the analysis—or smartphones that function as sensors (Andrejevic & Burdon 2015). What was once elaborated manually through the site is now collected and crunched by algorithms that provide insights, notifications and recommendations for a better knowledge and control of one's body and mind.

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Barry, L. (2020). The quantified self and the digital making of the subject. In M. Stocchetti (Ed.), *The digital age and its discontents: Critical reflections in education* (pp. 95–110). Helsinki: Helsinki University Press. https://doi.org/10.33134/HUP-4-5

The impetus to attribute scores to individuals is hardly new; it was once the appanage of teachers and surveillants in what Foucault coined 'the disciplinary power', in its endeavour to correct and control. For Foucault, these techniques aimed at bringing each individual body to behave according to a desired norm, posed as normal. Normalization was achieved through constant measuring and the sanctioning of deviance, producing docile bodies and subjects (Foucault 1995).

The technological capacities for measuring and ranking have drastically changed since the 19th century that interested Foucault; the type and the volume of information, the manner in which it is collected, but also the agent of the collection and the ways of interpretation have all changed. The advent of big data technologies in the domain of bodily measurements implies a shift in the constitution of the subject that I would like to analyse here. While the modern subject developed with the injunction to conform to a static, biographical narrative that had to be *said*, the quantified self is driven by a series of fluctuating numerical indicators that are immediately collected by sensors. Yet, these digital traces cannot be transformed into a meaningful representation of the self without the algorithms that are assumed to give an objective overview on a person's well-being. But if one admits with Foucault that the subject is always constituted in relation to truth (Foucault 2017), what kind of self is produced by a discourse of truth that is the output of an algorithm?

Moreover, the various platforms and smartphone apps for the tracking of the self all claim to enhance a subject that gets better control on his body and his health, thanks to recommendations and quantified feedbacks. But what is actually being managed by the algorithms? This numerical outlook seems to point to a hyper-rationalized approach to self, one that strengthens the modern *homo oeconomicus*. However, a deeper analysis reveals that the behavioural economics that inform the algorithms actually bypass the rationality of the agent and manipulate instead impulsive and addictive responses.

After *Discipline and punish*, Foucault turned to technologies of the self in late antiquity to better understand how the subject is constructed or constructs itself, in relation to specific forms of government, each constituting a regime of truth. I will track in the first section the use of numerical indicators in modern forms of government, in order to isolate the specificity of digital governmentality. The second section highlights how the quantified self participates in the construction of true discourses that rely on numbers for the sake of self-knowledge. Finally, the final section questions the control over the self-promised by the recent tracking applications.

Numbers in Regimes of Truth—a Genealogy

There are two ways to characterize a regime of truth: the first shows the imbrication of scientific discourses with mechanisms of power; the other generalizes the power implication of true discourses, from their scientific

form to any other form, such as confession, for example (Lorenzini 2015). The endeavour to attribute a number to individual behaviours or physical activities, at the core of the quantified self, belongs to the first kind of regime; the individual score seems indeed to imply the existence of a scientific knowledge behind the number. Yet, in his analysis of the disciplinary and security regimes, Foucault has shown how numbers can be used in very different manners. Current big data technologies further combine those techniques in a novel way that I would like to isolate here, as this will serve the understanding of the knowledge at the core of the quantified self.

The generalized examination as a technique of government in the 19th century made grades a central instrument. Discipline indeed works by differentiating and comparing individuals, thanks to the grading system. This technique served the normalization of the population, obtained through five operations:

> [The discipline] measures in quantitative terms and hierarchizes in terms of value the abilities, the level, the 'nature' of individuals. It introduces, through this 'value-giving' measure, the constraint of a conformity that must be achieved. Lastly, it traces the limit that will define difference in relation to all other differences, the external frontier of the abnormal … The perpetual penality that traverses all points and supervises every instant in the disciplinary institutions *compares, differentiates, hierarchizes, homogenizes, excludes*. In short, it normalises. (Foucault 1995: 182–183, emphasis added)

In the French 'republican school' of 19th-century, grades were used to define the individual by measuring his conformity to a desired behaviour, posed as normal. This model was valid in various spaces, from the school to the barracks or the factories. The normalization that interests Foucault occurs with the correction of deviant or abnormal behaviours; those deemed as dangerous were further enclosed in prisons, in order to transform them into 'normal' individuals (Foucault 1995: 231–256).

This disciplinary control on the collective via numbers continues to exist to this day in many spaces: besides grade systems that pave the way of an education, one thinks of the periodic evaluations that have become commonplace for the management of work forces (Lupton 2016: 110). Yet, where Lupton speaks of 'an imposed self-tracking', one might rather see here a surveillance of the traditional kind. Reports from Amazon's workplace might be a case in point: in its warehouses, employees are monitored by sophisticated bracelets that measure the number of boxes they pack every hour; in its offices, algorithms measure the performance of its staff and encourage them to use the 'Anytime Feedback Tool' to send feedback on one another. All these elements contribute to the constant ranking of the workers, those at the bottom—just like Foucault's 'abnormals-', being eliminated every year (Kantor & Streitfeld 2015).

The disciplinary techniques aim at 'pinning' an identity to an individual and at correcting his behaviour; liberal government by contrast functions with

statistical tools that abandon the individual level and make another use of the numbers gathered on each. The collection of statistics indeed allowed the isolation of regularities at the aggregate level, and the emergence of a new object of knowledge in the form of the population (Foucault 2004). The 19th century's 'avalanche of numbers' (Hacking 1990) shaped the population at large; the census functioned as a strong instrument for both the collection of data and the construction of modern national states (Anderson 1988; Rose 1999).

Liberal government, in contrast to discipline, does not try to reduce the diversity via normalization, but manages this at the aggregate level. One can take as an example credit scores as they developed in banking. The process consisted at first in splitting a population of borrowers according to their assumed risk level: people were not asked to change behaviour, but were assigned to a group of assumed similar people. The association with a specific group further determined the interest rate they obtained. Technically, the method allowed the bank to quantify the risk of credit failure *on a group* of similar borrowers, for whom an average rate of failure could be computed (Lazarus 2012); compared with the disciplinary grade, the credit score is valid at the group level alone, and results from a very different work from the individual examination. For the individual, by contrast, the score is most of the time incomprehensible (Pasquale 2015). It also affects him in a very different manner from the discipline; the system works on the assumption that the rational individual will make the decision to borrow or not, based on his perceived value of the credit offer. There is no physical sanction, but a self-selection and a behaviour 'freely chosen' based on indicators and price, which further create new forms of exclusion.

The constitution of groups in this mode of government is at the heart of their management. Desrosières thus describes how the statistician relies on questionnaires for creating classifications. The specialist is indeed needed to elaborate categories that codify and homogenize an otherwise diverse reality: by mapping the reality according to an a priori understanding, he was sometimes tackled for imposing a subjective preconception of what he intended to study (Desrosières 2008). Porter further insists that this homogenization implies the renunciation of individual specificities. There is indeed a tension between the objectivity that one aims at reaching thanks to numbers, and the subjective data upon which these numbers build. As Desrosières puts it, the averaging allows for the emergence of objectivity, by 'melting' individual contingencies into a rational order (Desrosières 2014: 161). Objectivity thus implies the erasure of everything subjective for the sake of standardization and the constitution of workable numbers:

> Inevitably, meanings are lost. Quantification is a powerful agency of standardization because it imposes order on hazy thinking, but this depends on the license it provides *to ignore or reconfigure much of what is difficult or obscure*. As nineteenth-century statisticians liked to boast, their science averaged away everything contingent, accidental,

> inexplicable, or personal, and left only large-scale regularities. (Porter 1996: 85, emphasis added)

Something radically different is happening with the digital turn. The 'datafication' of the world (Mayer-Schönberger & Cukier 2013) means indeed that the data is now obtained without human intermediaries nor codification. There is therefore no standardization performed behind the numbers: the subject's behaviour has become accessible and measurable without the mediation of the questionnaire. Paradoxically, what was once considered as a warrant of objectivity (the statistician's codification) is now seen as a source of errors. Data scientists working on digital footprints contend that 'unlike surveys and questionnaires, Facebook language allows researchers to observe individuals *as they freely present themselves* in their own words' (Schwartz et al. 2013: 13, emphasis added).

Gary Wolf has the same type of claim when he questions standardization as a poor description of reality: 'people are not assembly lines. We cannot be tuned to a known standard, because a universal standard for human experience does not exist.' He thus participates in recent trends to adjust knowledge to the specificities of the individual and the rejection of previous, aggregate forms of quantification: 'behind the allure of the quantified self is a guess that many of our problems come from simply *lacking the instruments to understand who we are*' (Wolf 2010, emphasis added).

In this strand of thought, while original credit scores aimed at roughly dividing the population, they have become more refined over time, with current scores being based on behavioural data (the individual's credit history) alone. The FICO scores in the United States now claim to be truly individual: 'your FICO scores are unique, just like you'.[2] It has become public information that can be purchased by anyone, and reflects a person's credit reputation (Lazarus 2012). The statistical management of borrowers has thus evolved from the aggregate average of the previous period to individual predictions.

In another domain, Harcourt describes how mathematical models have developed in the judicial domain in order to *predict* the chance of recidivism of convicts; the aim is no longer to give a description of 'who one is' (as was the case in the disciplinary regime), nor to give a statistical average for a population (as with early credit scores). The aim is now to predict the specific behaviour of an individual, measured by the probability of acting in the future in a certain way. This score is used as a tool to decide who should be released from or maintained in detention (Harcourt 2006).

The current breakthrough of predictive analytics that accompanies the accumulation of data on each individual seems to generalize this predictive approach (Siegel 2016). Siegel distinguishes between traditional statistical techniques of forecasting and the new algorithmic capacity to predict as follows: 'whereas forecasting estimates *the total number of ice cream cones* to be purchased next month in Nebraska, predictive analytics tells you *which individual Nebraskans*

are most likely to be seen with cone in hand' (Siegel 2016: 16, emphasis added). Algorithms are thus calibrated so as to predict online *individual* behaviour.

The scores have therefore taken different meanings over time: they were first a measure of the distance to the norm, then the measure of an average within a group and, most recently, they seem to evolve towards representing the individual probability of performing a specific action. But there is one feature that they all have in common: the score, be it a grade or a probability, is attributed by an external party, for the sake of managing the collective. The consequences associated with a specific number are also decided by a third party: both the teacher at school and the banker attributing loans are those who make decisions about the individual under observation. As Foucault puts it, the individual produces the truth, but it is interpreted by the 'masters of truth' (Foucault 1990a: 76–77). Something different seems to happen with the quantified self.

The Quantified Self: Self-Knowledge through Numbers

In the regime of truth implied by discipline, Foucault claimed that the subject is a product of power, always already subjugated in its mechanisms: the normalization process creates docile bodies necessary for the functioning of early industrial societies. The 'self-knowledge' advanced as a slogan in the Quantified Self site points rather to another kind of regime of truth; the numbers are indeed organized so as to help the subject make sense *of his own self*. At first glance, it belongs to the 'techniques of the self' that Foucault studied in his last years, briefly defined as follows:

> Those intentional and voluntary actions by which men not only set themselves rules of conduct, but also seek to transform themselves, to change themselves in their singular being, and to make their life into an *oeuvre* that carries certain aesthetic values and meets certain stylistic criteria. (Foucault 1990b: 10–11)

The disciplinary truth—the knowledge acquired by the examiners to sanction and correct individuals in order to bring them to behave 'within the norms'—is here replaced by a code of conduct freely chosen by a subject, in order to obtain mastery on his self.

For Gary Wolf, self-knowledge was for long confined to the imprecise use of words. In his view, the continuous collection of data rendered possible by recent technologies (wearable censors or smartphones) transforms the statistical knowledge *once used for the understanding of aggregates* into a tool for the understanding of the self. Large amounts of data are indeed becoming available on each individual. Since the data of questionnaires was costly, it was adjusted in advance to the purpose of the enquiry; working on few variables, the statistician was limited both technically and practically by the amount of

information at hand. The digital turn by contrast means that the data scientist works with tables where variables are more numerous than users (Kosinski et al. 2016: 496). Hence, once applied to the population as a whole, statistics become accessible for the interpretation of individual data.

The point though is that the data at stake is drastically different from those gathered for census purposes: it is the 'contingent, accidental, inexplicable, or personal', all that was once left aside, which is becoming most valuable. The information gathered through questionnaires demanded a codification on the side of the practitioners, but further implied, on the side of the individual answering the questions, that he *consciously* positions himself as regards his answers. As Foucault puts it, the subject is constituted in acts of truth where he binds himself to what he enunciates (Foucault 1990a: 62). The classification was further known to produce retro-actions on the individuals thus classified (Hacking 2007).

The big data by contrast is immediately collected as online *behaviour*. The fact that no human intervention is needed also means that most of the data collected takes the form, among others, of online traces or footprints that are not usually conscious, and remain difficult to grasp for the individual who produces them (Rouvroy 2013). Andrejevic and Burdon (2015) further notice the passivity of the data subject; it is magnified in the case of quantified self, since the data that comes now to the fore consists of bodily indicators such as heartbeats and blood pressure—intrinsically unconscious and passively transmitted factors. It further seems to deepen Rose's 'somatization' of the self, by giving it a numerical outlook:

> Selfhood has become *intrinsically somatic*—ethical practices increasingly take the body as a key site for work on the self. From official discourses of health promotion through narratives of the experience of disease and suffering in the mass media, to popular discourses on dieting and exercise, we see an increasing stress on personal reconstruction through *acting on the body in the name of a fitness* that is simultaneously corporeal and psychological. (Rose 2001: 18, emphasis added)

More drastically even, elements that used to be consciously understood through words, such as feelings, moods and states of mind, are now inferred from bodily indicators, or online posts (Kambil 2008; Cambria 2016). Anxiety, for instance, is now equivalent to a stress level, measured by a 'heart rate variability' indicator. The data is collected from heart pulses and transformed into information accessible to the subject via the application, which thus learns about his feelings via the sensors (Hilton Andersen 2014; Butcher 2017). The quantified self therefore illustrates a trend where the 'ethical substance' for the work on the self (Foucault 1990b: 26) is not to be found in conscious acts or feelings, but in numbers collected on unconscious bodily functioning.

Finally, the successful machine-learning treatment of online texts—the conscious part of the traces left by users—further transforms our understanding

of language. For LeCun and colleagues, recent developments in natural language processing indeed 'raise serious doubts about whether understanding a sentence requires anything like the internal symbolic expressions that are manipulated by using inference rules' (LeCun, Bengio & Hinton 2015: 441). The new data and techniques bring a knowledge of the self that is therefore deeply different from both the statistical knowledge of liberal governmentality and the biographical knowledge of the discipline.

The quantified self, which intends to make of the digital subject a master of his own self, further seems to result from two significant shifts: the first is the 'datafication' of the world (Mayer-Schönberger & Cukier 2013) that allows the collection of data on life itself; the second is the use of statistical techniques on the individual as with the above-mentioned new credit scoring techniques. The knowledge of the self is therefore transformed into a numerical enterprise; as Rudders puts it: 'the idea is to move our understanding of ourselves *away from narratives and toward numbers*, or, rather, to think in such a way that numbers are the narrative' (Rudder 2015: 19, emphasis added).

The Digital Self: A Rationalization?

One of Foucault's main findings as concerns the process of the constitution of the subject (subjectivation) is that it always implies a relation to truth (Foucault 2017). Early antiquity techniques of the self, for instance, were founded on the adoption of a rule of conduct as principles that had to be memorized and practised (Foucault 1990b). The subject thus formed can aim at self-mastery—as is the case with the Stoic self—or, as in early Christian practices, at a total renunciation of the self (Foucault 1990b: 27). As Judith Revel puts it, subjectivation is entrapped into a chiasm between on the one hand an autonomous subjectivation (in the form of an invention or a transformation of the self) and, on the other hand, an objectivized subjectivation in the form of subjection (*assujettissement*) (Revel 2016: 171). In this section, I will examine the type of subject implied by truth expressed with numbers.

Notwithstanding the obvious impossibility to transpose techniques of the past onto current societies, one cannot help but be struck by some similarities of the new self-construction with its early ancestors. Indeed, just like the Greeks beforehand, the quantified subject starts by adopting some goals that he strives to achieve. Where the Greek subject was asked to practise an evening examination in order to measure the distance between the desired behaviour and his actual deeds, the digital subject has data being collected on his behaviour and distance to the goal being measured (this time through numbers) and exposed via graphs or indicators in the app. Self-tracking thus involves that data subjects confront their own personal information, in order to optimize and improve their lives (Lupton 2016). From this perspective, it seems indeed that self-knowledge, once acquired through discourses, is now obtained through numbers, for the sake of transformation and mastery.

The collection of continuous and systematic information in the form of numbers is supposed to further warrant an exact depiction of the self, which was not possible with words:

> Humans make errors. We make errors of fact and errors of judgment. We have blind spots in our field of vision and gaps in our stream of attention. Sometimes we can't even answer the simplest questions … We make decisions with partial information. We are forced to steer by guesswork. We go with our gut.
>
> That is, some of us do. Others use data. (Wolf 2010)

The techniques of the self, which have admitted changing historical forms (Sauter 2014), would be therefore entering a new era thanks to big data. Wolf further claims that thanks to individual data and the self-knowledge it allows, the subject becomes aware of his own specificity, thus resisting normalization. As public health indeed aims at standardized procedures applied to all, it ignores individual needs: 'the idea that we can—and should—defend ourselves against the imposed generalities of official knowledge is typical of pioneering self-trackers' (Wolf 2010).

In the same strand of thought, Topol sees the future of medicine in predictive medicine, with people bringing 'their own data' to the physician (both indicators collected on a daily basis through sensors, and genome scan data)—in order to have the treatment adjusted to their specific case (Topol 2010). If this indeed is the future of health, it seems to have interestingly reversed the power relations implied by the disciplinary techniques described in the first part. By giving the knowledge in the data to the data subject himself, the individualization propelled by big data technologies serves his goals rather than those of a third party.

Yet, the shift from words to numbers has a singular importance as concerns the truth that binds and constructs the subject. As Foucault observes on ancient Greece:

> The *meditatio* … involves ensuring that *this truth is engraved in the mind in such a way that it is recalled immediately if the need arises*, and in such a way that we have it ready to hand; consequently making it a principle of action. It is an appropriation that consists in ensuring that, *from this true thing, we become the subject who thinks the truth, and, from this subject who thinks the truth, we become a subject who acts properly*. (Foucault et al. 2005: 339–340, emphases added)

The precepts followed by the stoics have been replaced, in the case of the quantified self, by a computed recommendation or simply by the numeric indicator showing the level of achievement. The incorporation of ancient precepts was obtained by a 'subject who *thinks* the truth', who had to perform a hermeneutics

in order to become a subject, the thinking part being as important as the acting that follows. In the case of numerical outputs and the replacement of words by the immediacy of numbers, the hermeneutical constitution of the ancient self has collapsed. This, for Wolf, is a further warrant of more accurate knowledge: 'when we quantify ourselves, there isn't the imperative to see through our daily existence into a truth buried at a deeper level' (Wolf 2010).

It is possible to look at this shift as the hyper-rationalization of agents turned into entrepreneurs of themselves; in such a context, the reliance on numbers, and on numbers alone, shows the sweeping impact of the entrepreneurial culture—where key performance indicators (KPIs) have become the guiding tools of sound management (Campbell & Hwa 2012). Lupton situates the Quantified Self movement within the audit culture and the aspiration to accountability (Lupton 2016: 115–116), in what could be seen as a refinement of the instruments at the disposal of the *homo oeconomicus*. The quantified conception of selfhood brings indeed to the fore 'the importance of self-awareness and self-improvement (the attempt to be "an *optimal* human being" and "your *best* self") and also the role played by self-interest ("studying yourself as an interesting topic")' (Lupton 2014: 3, emphasis added). The numbers would thus offer an indication to act (the KPIs are indeed tools for decision making) that bypasses the need to construct a true discourse beyond the truth of the indicator itself.

However, I would rather suggest in what follows that a close look at big data technologies shows that they rather tend to discard the conception of the subject as *homo economicus*, in a couple of ways. First, the construction of the digital self makes of the algorithm a preferred interlocutor (Karakayali, Kostem & Galip 2018: 5), with specific problems. Contrary to a mentor that might express empathy and indulgence, the verdict of numbers is without appeal: 'Machines don't understand the value of forgiving a lapse, or of treating an unpleasant detail with tactful silence. A graph or a spreadsheet talks only in numbers, but there is a policeman inside all of our heads who is well equipped with punishing words' (Wolf 2010). Wolf further describes the hectic behaviour of people that thus become obsessed with the indicators of their own failures.

In the same strand of thought, Karakayali, Kostem, and Galip enlighten the dependence created by music recommendation systems.[3] A song that would be heard without being recorded in a user's profile leaves him with a feeling of incompletion because 'users consider the "data" transferred to their libraries through scrobbling as a part of themselves' (Karakayali, Kostem & Galip 2018: 10). Moreover, since the application incites to always diversify one's musical taste, the 'flow of recommendations ensures that diversification is never completed but remains an endless pursuit' (ibid.: 11): the dependence is not a by-product of the recommendation system, but actually one of its goals.

The process of quantifying emotions and affects (Cambria 2016), evoked in the previous section, serves in fact a new economy, I would suggest, where impulses and desires are being managed, rather than rational behaviour. This is

confirmed by other domains where recommendation systems are involved: state of the art research in data science consists indeed in being able to infer from online behaviour the feelings of the agent, in order to adjust the next offer to his desires and characteristics (Couto 2017; Radford, Jozefowicz & Sutskever 2017).

Nir Eyal thus describes how state-of-the-art behavioural economics inform today recommendation systems so as to create 'hooked' users. He interestingly defines habits as '"automatic behaviors triggered by situational cue:" things we do with little or no conscious thought' (Eyal 2014: 1). In his attempt to transform his self and build new habits, I would like to argue, the quantified self actually accepts to subject himself to the recommendation system that builds additional habits—the unconscious addiction to the application that serves his conscious transformation. The 'Hook model', aimed at building both types of habits, functions within a closed loop of trigger-action-reward (Liu & Li 2016). And, indeed, the data of the quantified self usually feeds 'habit transformation apps', which use triggers as daily reminders and rewards based on the achievement of specific milestones (Stawarz, Cox & Blandford 2015).

The variability of the reward is further key to the creation of excitement, curiosity and the need to come back. In the economy of smartphone apps, the user's 'engagement'—his propensity to continue using the app (Eyal 2014: 95–134; Liu & Li 2016)—is the key indicator of success, rather than the progress made towards the user's personal transformation goal.

Furthermore, since the judgment on the achievement level is built within the app as a key product of the algorithm (the trigger), it is not the quantified subject's own reflection. Ironically, then, the true discourse on the subject is not said by the performing subject, but is rather computed based on behavioural data. If such is the case, it bears some features of the Christian confession, where the scientific value of what is said escaped the confessing subject:

> The truth did not reside solely in the subject who, by confessing, would reveal it wholly formed. It was constituted in two stages: present but incomplete, blind to itself, in the one who spoke, it could only reach completion in the one who assimilated and recorded it. It was the latter's function to verify this obscure truth: the revelation of confession had to be coupled with the decipherment of what it said. The one who listened … was the master of truth. (Foucault 1990a: 66–67)

The priest's hermeneutic function is replaced by the indicators of performance and the rewards offered to the quantified subject, hence creating a 'quantified true discourse'. Besides, as soon as numbers have taken precedence over words and the volume of data makes their manual treatment inconceivable, the algorithm is perceived as more trustworthy than any mentor could ever be (Reigeluth 2014).

Furthermore, the 'Hook model' is based upon the techniques of both online advertising and game industry that flourished with the Internet (Eyal 2014: 4).

It thus combines elements of the individualization process that accompanies the datafication described in the first part, with 'gamification' (Whitson 2015), defined as 'the permeation of non-game contexts with game elements' (Schrape 2014: 22). The trend is not specific to habit transformation apps, since gamification is becoming more common as a technique of government at large (Schuilenburg & Peeters 2017). While Schuilenburg and Peeters insist on the gift being the counterpart of surveillance and control (see also Whitson 2013), I would rather point to how gamification builds in fact a digital version of behaviour regulation, as again a combination of discipline and statistics, where rewards would have replaced punishment. As Eyal puts it: 'the convergence of access, data, and speed is making the world a more habit-forming place' (Eyal 2014: 14).

Gamification builds upon an accumulation of points, obtained through repetitive 'good' behaviour (Whitson 2013). It actually enlarges to other domains the token economy first conceptualized in behavioural psychology in the 1960s, for the sake of modifying undesired behaviour. In the therapy, good acts are associated with points (secondary rewards), which can then be converted into items (primary rewards) (Wexler 1973), thus positively reinforcing them. For Wexler, this is a form of 'Skinnerian operant conditioning', that is, the conditioning of specific actions, that come to be performed automatically rather than rationally. Used in therapy and education (Kazdin 1982), this method's assumptions concerning the individual couldn't be further from those of a *homo oeconomicus* taking decisions by maximizing his utility. The quantified self apps seem to transpose these techniques to the digital world. What remains unclear, though, is whether the habit transformation they obtain concerns the created addiction to the app, or the claimed control on and knowledge of one's body through numbers, or both. What is more obvious is that the disciplinary techniques are transformed so as to become pleasurable; the addictive power of self-tracking comes from the enjoyment associated with the gamification of discipline (Turel & Serenko 2012).

Conclusion

The Quantified Self movement characterizes in many ways the current digital predicament; it builds upon the huge volumes of data available at the individual (and infra-individual) level, combined with technologies that produce insight and guidance for a new form of self-knowledge. It thus takes the entrepreneurial self to another level of involvement: the individual seems now to have gained a deepened understanding of his body indicators and to be taking charge of his health and well-being without the need of mentors.

But it also illustrates the other side of the digital era, which is often said to mark the end of theory (Anderson 2008; see also Fisher, Chapter 6, in this volume). Algorithms function without a priori theories or assumptions, and the

new knowledge bypasses the expert that used to give the data its meaning. Algorithmic knowledge doesn't need hermeneutics. My contention here is that it also discards the rational individual as an object of knowledge; what is currently being modelled is not the utility maximization of the *homo oeconomicus*, but rather the impulses and emotions that can be turned into further dependence and addiction. Focused on the collection of behavioural data and the prediction of future behaviour, the digital era thus propels a self of a new kind. The relation to self indeed takes the shape of an objectivation of the body, grasped via numbers. The digital subject thus exhibits a new negotiation of his simultaneous subjectivation and subjection to a truth produced by the algorithm.

Notes

[1] http://quantifiedself.com/

[2] https://www.myfico.com/credit-education/whats-in-your-credit-score

[3] These recommendation systems function in the same manner as other applications of the quantified self since 'the scrobbler is akin to a wearable technology that accompanies users' (Karakayali, Kostem & Galip 2018: 8).

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CHAPTER 6

Can Algorithmic Knowledge about the Self Be Critical?

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The Algorithmic Episteme

In the last two decades or so, we have been witnessing the rise of a new episteme, a new way of knowing, involving the collection of big data and its analysis by means of algorithms. The algorithmic episteme is mobilized to produce knowledge not merely about the objective world, but also increasingly about the internal world of individuals, about the self. An ever-increasing number of digital tools are developed to know our subjectivity: our tastes, wants and weaknesses (Cheney-Lippold 2011; Lupton 2016). But what is the nature of this knowledge? More specifically, what assumptions does this knowledge make concerning human beings, and what are its political ramifications? I wish to think through these questions by asking whether algorithmic knowledge can be critical at all. I follow the critique of positivist knowledge developed by the Frankfurt School. The Frankfurt School launched a critique on the accepted model of knowledge production in the social sciences which it deemed 'scientism'—an emphasis on the means of science rather than on its ends. I focus here on Habermas, who constructs most eloquently and systematically this critique. By comparing

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algorithmic knowledge about the self to psychoanalytic knowledge, I will argue that algorithmic knowledge cannot be critical by construction. I will end by reflecting on the political possibilities of the algorithmic self.

In this chapter, I offer a preliminary reflection on the knowledge about the self which emerges within the socio-technological paradigm of digital media, referred to here as the algorithmic episteme. This refers to an expanding assemblage of technologies, practices, sites and bodies of knowledge aimed at translating data—produced by ubiquitous monitoring devices—into knowledge about the self. This entails the incessant production and accumulation of data (big data) in digital sites (platforms and applications) designed to monitor user-generated data; the construction of technological tools which make sense of this data, rendering massive amounts of personal data into knowledge (algorithms); a body of knowledge concerning these practices (data science); and a plethora of professionals implementing the algorithmic episteme in varying fields, from the criminal justice system (Chan & Bennett Moses 2015; Mehozay & Fisher 2018) to health (Khoury & Ioannidis 2014).

The algorithmic episteme purports to overcome three obstacles in the ability of human beings to know themselves (see e.g. Mayer-Schönber & Cukier 2013):

1. **Metaphysics**—the knowledge that algorithms produce about human beings requires no metaphysical, or theological, assumptions about humans;
2. **Theory**—it requires no theory or hypotheses as a precondition for knowledge; instead, it produced knowledge without causality;
3. **Hermeneutics**—it bypasses human reason and subjective interpretation en route to understand human beings.

Overcoming these obstacles to self-understanding is based on Dataism, a theology of data which sees it as the basic building block for knowledge, and sees data—specifically the data produced by individuals while engaging with digital technology—as comprising the 'source code' of humanness (van Dijck 2014). Nicholas Rose conceptualizes the theology of neuro-science which sees neural activity similarly (Rose & Abi-rached 2013). In this case, however, the building blocks are not naturally occurring electrical transmissions, but rather digital data registered as indicators of action and behaviour, or performance (Zuboff 2015). Hence, I suggest we think about the algorithmic episteme as offering performative knowledge (Callon 1991).

Another reason to think about algorithmic knowledge as performative is that its underlying orientation is performative prediction (Mackenzie 2015; Aradau & Blanke 2017): an attempt to forecast our behaviours in order to interfere with them and reorient them. Recommendation engines, for example, monitor behavioural data of users in a platform (or across several platforms) and render them into personalized real-time recommendations. But how is the plethora of data—big data—collected from human behaviour rendered into knowledge

about human beings, such as their taste or desire? Data scientists and data practitioners insist that this is merely a matter of mathematics. But I would like to argue that such rendering—translating data into knowledge about humans—requires some conceptualization of what humans are (Cheney-Lippold 2011), or some theology, however implicit it may be (and in the data science discourse, there is no doubt that this human conception is left not merely implicit, but outright denied).

For matters of simplicity and illustration—also acknowledging the complexity of algorithms and the problematics of suggesting a unifying discourse—I want to focus on one area where algorithms are heavily implemented: digital media. Digital media platforms are now regularly trying to characterize their audience in an effort to 'seek their audience' (Ang 1991) and offer real-time personalized suggestions, either advertisements, products or actual content (video clips, posts, articles and so forth).

Seeking the Mass Media Audience

The media has a long history of trying to know the audience and characterize it. Because media institutions do not come in direct contact with their audience, they need to have some conceptualization of who they speak to. After a modest beginning of 'imagining' the audience (de Sola Pool & Schulman 1959), during the 20th century, a whole new body of knowledge developed among mass media organizations. It assumed that the audience should not be looked at *en bloc*, but rather as comprised of different categories. In order to characterize these categories, the mass media, in close conjunction with academia, adopted what we might call the scientific episteme (Ettema & Whitney 1994: 9; Buzzard 2012: 3, 13ff). The scientific episteme for knowing the audience is based on (1) social and cultural theories, (2) empirical research (such as questionnaires or focus groups) and (3) a representative sample of the population with a rather low N (Napoli 2010).

The scientific episteme assumed that the audience is comprised of groups differentiated on the basis of demographic, or sociological, categories: gender, class, income, education and so forth. Based on this knowledge, mass media outlets attempted to give each category the content it assumed it liked and wanted, or that was appropriate to it. For example, based on a theory that asserts a high correlation between class position and cultural taste (*à la* Bourdieu), media outlets created differential content and ads, or segmented the media; for example, publishing women's and men's magazines. The conception of human which underlies the scientific episteme is ascriptive, seeing each individual as an imprint of the social category to which it belongs. The audience, then, is divided into a few relatively homogenous categories.

This move of the media towards splitting and categorizing the audience was dialectical in terms of knowledge about the self. At the same time that

the scientific episteme characterized the audience, it also helped in shaping a conception of self: individuals understand themselves through the way in which others characterize them. This is particularly true when such knowledge is translated into practice habitually encountered by the audience. Women's and men's magazines also help constitute such gender categories. Such magazines interpellate, in Althusser's terms, individuals into a social position, thus validating and reaffirming specific social categories (Althusser 1970).

Digitally Seeking Users

The media environment has been changing radically in the last few decades, with the rise of digital media. This sea change in the media environment is complex, comprised of multiple and at times contradicting, technologies, social actors and dynamics. As mentioned above, one of the most recent major transformations within digital media has been the rendering of immense quantities of data, registering mostly the behaviour of the audience, or users, as they came to be called, and rendering them into knowledge which is fed back into the media, mostly through personalized content provision. We cannot understand this huge effort and investment in the algorithmic translating of data into knowledge as a mere technical move, aimed at calculating more quickly and efficiently what we once calculated on a piece of paper. Rather, it offers a new epistemology and a new way to conceptualize individuals and think about the self.

What is the conception of humans which underlies the algorithmic episteme? What are the tenets of knowledge about the self-rendered from user-generated data? Three tenets can be discerned. First, the algorithmic episteme offers an a-essentialized conception of humans—what Rogers has called a post-demographic conception (Rogers 2009: ch. 7). Such conception is indifferent to ascriptive social categories (such as gender or income), and indifferent to the master narratives of modernity (such as nationalism and class). Instead, it upholds a subject that is characterized by the pattern of data it produces. Such conception about the self, then, presumably requires no theory of the self. The immense quantity and qualitative variety of data helps us make the leap from actual empirical phenomenon to knowledge without the need for abstraction and theory.

Second, under such assumptions, the algorithmic episteme's approach to data is what we might call omnivorous. Since there is no theory about the self, there is no a priori ability to know what kind of data might be relevant to knowledge about the self. Hence, algorithmic knowledge is inherently prone to collecting and processing as much data as possible. No type of data can be ruled out as too mundane or too esoteric as a means to understand the self.

And third, not only theory is bypassed en route to knowledge about the self, but also consciousness and reason. Under such conception, knowledge about the self is created by bypassing reason—the reflexive and critical component

of the self—and accessing its underlying 'material', objective and performative facets. Such a positivist, objectivist perspective on knowledge rejects an interpretive and narrativist conception of the self and turns towards technological mechanisms of data and algorithms that bypass subjective 'meaning'—or the hermeneutics of the self, constituted through a subjective and inter-subjective process—in order to reach the true core of humanness.

The algorithmic self, then, signals a rejection of a hermeneutic concept of the self that emerged with modernity, towards technological mechanisms that bypass conscious meaning. This represents a deep distrust in the ability of the conscious mind to help in the understanding of the self, and a technological route to bypass consciousness and understand the self on the basis of 'lively data', construed to be a more authentic, unbiased and reliable representation of the self. 'Lively data' (Lupton 2016) refers both to the liveliness and dynamism of the data, the fact that it is incessantly created and flows, and to the fact that it is based on 'life itself', every aspect of life—affective, communicative, relational and so forth—which is now registered digitally. The datafication of life means that our lives—from the mundane (like the time of day we order a product online) to the sublime (like the birth of our child)—are increasingly turned into data. Performative data is seen as more reliable foundations for the understanding of the self than subjective, narrativist and interpretive models of knowledge about the self (Bolin & Schwarz 2015).

Knowledge and the Self: Algorithmic and Psychoanalytic

To think about the ramifications of the algorithmic conception of the self, I would like to make a little detour here, before returning to the central path of the argument which seeks to point out the political ramifications of the new way by which digital media characterizes its audience using algorithmic knowledge. This detour briefly examines the link between reason and self-understanding and the corollary possibilities of political subjectivity. To think through this link, I will situate the model of the self, which arises from the algorithmic episteme, with two historical models of the self (which are still very much with us today), stemming from divergent epistemologies.

It should be quite evident that the algorithmic self poses a direct challenge to the reasoned, or liberal self. The *liberal self* is a model of subjectivity that is able to articulate an authentic position of the self vis-à-vis the world. The most central institutions of modernity are premised on such a subject: democracy, the capitalist market, the legal system, to name a few, all assume that such a self can be formed through education, or *Bildung* (Sennet 1992).

With digital media, such decisions are increasingly, albeit obviously partially, delegated to algorithms that weave data into the position of the self vis-à-vis the world. Thus, for example, recommendation engines of music applications, such as Spotify, help us formulate our musical taste, revealing to us what it is actually

that we like to listen to. In light of increasing algorithmic authority, the objective, technical and scientific aura, our trust in the ability of algorithms and their practical applications to reflect a truer, more authentic self, gets stronger. As mentioned above, seeking the audience entails not merely a detached gaze of a knowing institution, but acts on subjects, moulds and creates them; 'to collect, store, retrieve, analyze, and present data through various methods means to bring those objects and subjects that data speaks of into being' (Ruppert, Isin & Bigo 2017: 1). To the extent that algorithmic knowledge about users is translated into practice, such as recommendations engines, it is also experienced by users (Bucher 2016).

But a comparison of the algorithmic self with another modernist model might be even more revealing to assess the ramifications of this new epistemology. The idea that reason might actually be problematic as a means for understanding the self and that humans need to bypass consciousness to achieve a more authentic perception of their self did not arise with algorithms: it is actually a highly modernist idea. One of the most important critiques of the liberal self has been articulated by Sigmund Freud, who was also suspicious, like dataists, about reason. He argued that we do not have a direct access to our whole self, and developed both a theory and practice (psychoanalysis) aimed at bypassing reason in order to reach a deeper human essence.

Notwithstanding these similarities, in order to highlight the novelty of the algorithmic self, I wish to focus on what sets the *psychoanalytic self* apart. The key distinction pertains to a theory of the self. The performative knowledge about the self, created through big data and algorithms, is a-theoretical, almost intently anti-theoretical. It is a regime of truth that does not purport to offer a causal theory of *why* individuals behave in a certain way, but rather offers an algorithmic discovery of *how* they behave, their data patterns. Amazon might notice, for example, that people skimming through Ernest Hemmingway novels on late summer nights are more likely to also be interested in buying carpentry tools. We might be tempted—as social, cultural or psychological theorists—to offer positivist or interpretive theories unravelling the nature of that observed link, but such theories do not stem from the algorithmic episteme. It is in this sense that algorithmic knowledge has been infamous for being a 'black box', opaque system that is almost impossible to review and critique (Pasquale 2015). An example of the neglect of theory in the algorithmic episteme can be found in the central means of validating algorithmic knowledge: A/B testing. Within the algorithmic episteme, algorithms are considered to give a valid knowledge to the extent that algorithm A predicts observed behaviour better than algorithm B or no algorithm at all.

This is a key difference pertaining to the link between knowledge and practice, or between theory of the self and the actually existing self. Psychoanalysis offers critical knowledge about the self by creating a space between the actually existing self and the abstract, theoretical, even utopian self. Hence, psychoanalysis could point to observed, behavioural aspects of the self as belonging to different

components of that self. For example, when an individual says 'I behaved in manner X towards a person Y', she may proceed to discover that such a behaviour is an anxious reaction to reality, find out the root cause of that anxiety and through therapy change her behaviour the next time such anxiety appears.

Such a progressive move requires two important elements missing from the algorithmic episteme. The first is theory. And not just any theory, but *critical theory*. Psychoanalysis sees in the knowledge about the self a means to uncover that which hinders human freedom, and thus a means to point towards a quasi-transcendental move towards emancipation. Psychoanalytic knowledge about the self, therefore, opens up a space for facets of the self that do not yet show themselves in the actually existing, performing self. Such a self can demarcate a utopian horizon towards which it can be oriented.

To accomplish such a goal requires a second component missing from the algorithmic episteme: natural language. Language allows reflexivity, it allows reason to reflect and examine the self, and in turn transform the conditions of possibility of observed behaviour. Reflexivity allows us, for example, to behave anxiously and at the same time identify this behaviour as anxiety and as hurtful to self or others. In other words, a self, which does not yet exist, can outline a path for the actual self to walk in and become that. This can only be done through language, interpretation and reflexivity. It is precisely in that sense that Habermas insisted that psychoanalysis is not a positivist science like the natural science, but actually an exemplar of critical theory which has an interest in (and a capacity to create) knowledge which at one and the same time describes reality (theory) and allows the subject to move towards a desired reality (praxis) with the aid of reason (Habermas 1972: ch. 10).

The algorithmic episteme represents a collapse of that constructive space between theory of the self and the performative, actually existing self, as well as an impossibility to communicate in natural language. Algorithms paint a much more monolithic self: an acting or behaving self. It is a self devoid of leverage for critique, anchored much more firmly in the reality principle, in that which exists in a given time in the form of performative data. It is knowledge that relegates any other facts from the perception of the self, facets which can only be manifested through language.

Self and Political Horizons

The algorithmic self might be seen as another manifestation of a post-modernist critique of modernist selves such as the liberal self or the psychoanalytic self. And many are celebrating the withering of the ideal of reason and critique from the knowledge of the self, seeing that as opening new horizons for the construction of a less essentialist, more flexible and emancipated identity. This position is perhaps mostly upheld by post-humanists who see the algorithmic self as a technological embodiment of post-modern ideas (Barron 2003; Shilling 2005:

ch. 4; Fuller 2012). But in yielding the space between who we are and who we might become emerges a vacuum which allows systemic forces to penetrate the self with the purpose of moulding subjects who are more accommodating and lenient to these systems.

That is certainly now new. We can think of how industrial capitalism moulded a subjectivity that realizes itself by means of hard work, obedience, diligence and frugality (Gramsci 1971). Or how consumer capitalism moulded a subjectivity that realizes itself by means of consumption, hedonism and individualism (Bell 1976). We might now ask how informational, digital, network capitalism moulds a subjectivity that realizes itself through publicity, exposure, communication, sharing and surveillance (Fuchs 2011; van Dijck 2013; John 2016) (practices that create the raw material to produce algorithmic knowledge: data), and through delegating the understanding of the self to technological systems, the underlying rationale of which remains completely opaque and inaccessible for auditing through natural language.

This new conceptualization of the self as algorithmic is consequential not merely for the operation of digital media, but might also have political ramifications. If the algorithmic episteme conceptualizes individuals in terms of the data patterns they create, then what makes different individuals similar (or what might put them in the same category) is a similarity in data patterns. The algorithmic episteme suggests that we cannot say what is similar between individuals except that they show a similar data pattern in a given context. Two people showing similar data patterns on Amazon, for example, might be sociologically very different.

Algorithmic Self as Post-Political Identity

This shift from a demographic to a post-demographic identification of individuals, from identification based on natural language to one based on data patterns discovered by algorithmic processing of big data, is politically dangerous. Identity, in the sense of how individuals perceive and identify themselves, was based during modernity on ascription to categories of people who are identical among them. Thus, during the 20th century, a person might feel that she is part of the working class, or part of a gender group. Such ascription to a social category did not imply that everyone belonging to that group is identical in every way, but rather that anyone belonging to that group perceives herself as identical in aspects that are *politically significant*, for example, suffering from similar forms of discrimination, or sharing economic interests. Since their similarity to others in the group was understood in political terms, their individual identity was political as well. To be 'a worker' or 'a woman' during the 20th century carried an inherent political significance, regardless of whether or not one acted upon it.

The notion and practice promoted by the algorithmic episteme that we have no way of knowing ourselves by ascription to a social category threatens to undermine and deconstruct the foundations of political action. However

oppressive and totalistic they may seem, the mass media created categories of identity that could be spoken of with natural language, understood theoretically, be subjected to critique and resisted through political action. Digital media, in contrast, categorizes individuals based on data patterns which cannot be understood with natural language, spoken about or critiqued.

Under such conditions, the very ontology of identity is transformed: from a subjective construction of the self which identifies herself, and an inter-subjective construction of others who identify each other through an interpretive and critical process with a political horizon towards an objective construction of the self (Rouvroy 2013). According to Rouvroy, algorithmic knowledge about the self signifies a new governmentality which undermines the liberal self from 'above' (undercutting socio-political categories) and from 'below' (undercutting subjective interpretation, inter-subjectivity and language). 'Algorithmic governmentality', as she calls it, 'does not allow for subjectivation processes, and this for recalcitrance, but rather bypass and avoids any encounter with human reflexive subjects. Algorithmic governmentality is without subject' (Rouvroy 2013). The algorithmic episteme, then, undercuts the critical faculties inherent in narrative, speech and inter-subjectivity: 'calling each other into account through language, create occasions for individual and collective individuations which are always deviations from known patterns and profiles' (Rouvroy 2013).

As Habermas insists, the reflexive experience is the core of the practice which emancipates individuals from being an object and allows them to develop a subjectivity (Habermas 1972; see also Kellner & Pierce 2011: 106ff). Hence, this practice has to be controlled and done by the subject. In that sense, even if recommendation engines are able to characterize our taste and correctly predict what we would like to watch before we even think about that—and it is very likely they can, at least to some degree, as our taste *can* indeed also be thought of in objective terms—they already undermine the idea of taste as a project of subjectivation, and the practice needed to construct it. Under such conditions, even interpellation is undermined, and with it the possibility to be critical of that interpellation and resist it.

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CHAPTER 7

Platform Discontent against the University

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Technology and the Capitalist University

The long depression of capitalism catalysed by the financial crash of 2007–08 witnessed an ideological repositioning that emphasizes the private good of notionally public services like healthcare, welfare, education and so on (Hall 2015a). These are explicitly treated as commodities with access that is privatized or privileged (Davies 2014), and which can be used to re-engineer the production, distribution or allocation, and consumption of those goods or commodified services. In terms of post-compulsory education, this has led to a number of modes of analysis, including: first, the mechanics of financialization, marketization and privatization (McMillan Cottom 2016; Newfield 2016); second, analyses of capitalist activist networks, including policymakers working in conjunction with finance capital, transnational service providers like educational publishers and technology corporations, transnational non-governmental organizations like the World Bank, and philanthro-capitalist entities like the Gates Foundation (Ball 2012); and third, understanding the processes of commodification underscored by discourses of entrepreneurialism, which

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underpin individual or familial investment in human capital (McGettigan 2015; see also Ampuja, Chapter 2, in this volume).

In English higher education (HE), ideological remoulding has been immanent to a policy context that highlights discourses of educational consumption or the purchase of educational goods, as a means to accrue value. These goods are broken down into skills, knowledge and capabilities, and repackaged—for instance, in terms of access to accreditation and awards, learning materials and content, and services that support the student experience and well-being. As technologically enriched services, these offer institutions and their supply chains the ability to demonstrate value-for-money. In this context, such re-engineering intersects with reduced public spending on HE, predicated upon tripled student fees backed by income-contingent loans and Access Agreements. However, it has been extended by a radicalized, political economic context set by Her Majesty's Treasury (McGettigan 2015) in its focus upon productivity.

This focus upon notionally public institutions being re-geared as productive businesses or capitals has been amplified through the instantiation of competition among individual academics, disciplines and institutions, whose activities and impact are quantified. Quantification and flows of data are crucial in the ongoing re-purposing of the University as a productive domain, and in opening it out to other economic sectors which are able to make use of those data to commodify new services, and thereby extract value or rents. This has been discussed globally in terms of massive open online courses (MOOCs), in particular focused upon processes for creating commodities and data that can be curated for exchange-value (see Hall 2015b; Shanley, Swierstra & Wyatt, Chapter 11, in this volume).

In the English context, the Department for Business, Innovation and Skills (DBIS 2015) has enacted policy that links educational outcomes and HM Revenue & Customs tax data, in order to leverage data about populations of graduates and the value of their educational profiles. This connects to work commissioned by the Department for Education (DfE) on graduate (longitudinal educational) outcomes, and new regulatory structures through the creation of the Office for Students (OfS) enshrined in the Higher Education and Research Act (DfE 2017), which have generated an infrastructure for managing competition within the sector, through a focus on value-for-money and the availability of performance data.

The availability of such data frames a technocratic discourse for continuous improvement through the management of risk in open markets, with effective competition defined as the primary enabler of student and institutional success. Such metrics are immanent to the generation of human capital and commodity-knowledge, and they shape a context for the ongoing valorization of the labour of both academics and students. This is increasingly important in a competitive HE environment, precisely because the value of a commodity, or of a commodified service like an accredited award, is not given by its price. Rather, it is given by the quantity of labour that is socially necessary for its

production at a given, global, average productivity. It is given by the amount of labour embedded in the product. Thus, commodities produced by labourers with more knowledge or skills, or richer technologies, either have higher value or can be produced more efficiently, and deliver competitive edge.

However, capital is always seeking to drive down the cost of labour, in order to extract a surplus from its investment. This search for surplus-value brings labourers into asymmetrical relationships in the market, as their labour is sorted and compared, based on its ability to deliver value for the employer. While an educator might be producing a book, marking scripts or undertaking knowledge transfer, in the market their work is abstracted from its concrete context, so that it can be equalized across a global terrain. It is the integration of this abstract form of labour inside a technology-rich, educational context that is designed to produce wealth in the form of surplus-value, which can be described in terms of valorization (Hall 2018). This process tends towards the proletarianization of academic labour by rationalizing its processes or modes of production, such that labour-value as a cost of production (use-value) is reduced. Here, having appropriate performance data, locked inside systems of production that can be finessed in almost real-time, with feedback that enables new modes of production, is crucial. There is potential here for new cybernetic modes of management for academic production, rooted in quantification and the internalization of algorithmic regulation (McQuillan 2015).

One result of this refocusing of HE for productivity and profitability, by increasing the realm of valuable work (in that it generates new forms of capital), has been to subsume the politics of HE under economic dictates. Thus, governance and regulation tend to reinforce a normative, technology-neutral narrative of HE, immanent to progressive ideas of entrepreneurship, excellence and impact, and reliant upon educational outcomes as exchangeable commodities that demonstrate accrued human capital. Technocratic governance conditions academic work through mediations like private property, the division of labour and commodity exchange (Hall 2018).

It is important to recognize the inhuman impacts of techniques of re-engineering, and technologies that have been used to discipline labour both at work and across society more generally. This has been witnessed in increased reporting by academic labourers of ill-health, overwork and precarity (Hall & Bowles 2016). However, these moments of reporting point towards categories of experience that are analytically generalizable in the concrete experiences of individuals, but which also enable their source to be revealed in alienated labour (Hall 2018). The horizontal sharing of such narratives also enables a surfacing of experience that might coalesce as a shared operating system, architecture or platform from which struggle can emerge. The point of such revelations is to highlight the possibilities for deliberation, association and solidarity.

For academic labourers, struggle is immanent to, and cuts through, a range of intersecting narratives, and these intersections reveal commonalities of experience grounded in alienating and commodified work. This offers the potential

for reimagining that experience for a different social purpose. It is important to recognize that such reimaginings are situated historically and materially, with deep connections to the ability of communities to re-purpose technology for socially useful outcomes that point beyond value production (Haiven 2014). These include established transnational commons and peer-to-peer networks (P2P Foundation n.d.), alongside state-based interventions, like Ecuador's Free-Libre, Open Knowledge Society project (FLOK n.d.) or the Cybersyn project in Chile under Allende (Miller Medina 2005). However, they also include: first, a multitude of workers in the digital, platform economy struggling against precarity (Lorey 2017), including non-tenured academics and teachers; and second, social movements with educational intent, for instance, Rhodes Must Fall and work on decolonization emerging from Black Lives Matter. These use technologies to describe associational practices and values as pedagogical projects at the level of society.

Such descriptions can be enriched through engagement with the idea of digital platforms (Kornberger, Pflueger & Mouritsen 2017; Srnicek 2017), in describing knowledge production that reimagines social reproduction beyond institutions like the University. Is it possible for knowledge production, capitalized and valorized inside the University, to be liberated across the social terrain against capital's cybernetic control mechanisms, for more humane ends? Is it possible to bear witness to those humane ends as a movement beyond discontent, to describe new forms of autonomous activity that constitute 'self-government for the producers', and which point towards forms of education beyond 'the fetters placed upon it by class and government' (Marx 2008: 47)?

Following Marx's engagement with machines and technology (1991), it is important to critique platform technology as it reproduces new forces of production, which then enable new social relations and forms of organization, including precarious labour, insecurity and entrepreneurship of the self. Such forms of organization are a means of rationalizing necessary social labour and creating anew the sphere of heteronomy, which organizes the production of necessities (Gorz 1982; Marx 1991). This demands that academics reproduce new skills, knowledge and capabilities to be exchanged, and thereby annihilates the time for free activity or the sphere of autonomy. A critique of these processes asks: How do we liberate digital tools from inside organizations like universities, in order to create non-commodified spaces for direct, cooperative reproduction (Roggero 2011)? This needs to be an intersectional critique of institutionalized technologies and techniques, precisely because those bodies marginalized by class, race, gender, (dis)ability and sexuality have lacked power to widen their spheres of autonomy (Ahmed 2017; Ciccariello-Maher 2017). There is a clear need to describe the modes by which capitalized platform technologies enable social relations that are exploitative for those in the core of institutions, while it further expropriates those on the margins (Fraser & Jaeggi 2018).

This chapter describes the potential for the intersection of social movements of struggle with digital technologies, to uncover alternative imaginings for HE

beyond the quantified University. This is enabled in the production of socially useful knowledge specifically designed to refuse hegemonic power over the world. Here, discontent with the world as it is becomes a moment to re-purpose and transform technologies and techniques by embedding them inside solidarity economies. Such processes facilitate platforms for dissent. This explicitly challenges the transhistorical, positivist idea of the University as a space for knowledge production that co-opts technology in order to reinforce monopoly capitalism. It asks if discontent at the level of the platform might disrupt the University such that we can reimagine that a different higher education is possible.

Technology and Academic Labour

For Marx (2004: 493), technology is pivotal to the material, historical production of the world. The reinvention of forces of production generates productive capability, which is immanent to changes in social relations, individual and social conceptualizations of work and life, and relationships to nature and the environment. This is an active relationship between humans and their environment, as an ongoing, material work-in-progress that shapes time and space. As a result, our communal activity informs and is informed by the forces that enable us to reproduce ourselves socially.

However, inside the University, technology is used to re-engineer academic work, in terms of teaching, research, scholarship and administration, through processes that Marx (2004) referred to as formal and real subsumption. These processes enable capital to take control of previously unproductive sectors of the economy, to focus upon value-production. This occurs in two ways: first, as sectors or organizations are re-purposed so that the conditions of work generate value, in absolute terms—for instance, by lengthening the working day; and second, as sectors or organizations are transformed through organizational development or technological deployment, in order to generate value in relative terms. As sectors become more competitive and the terrain for accruing surplus value becomes more difficult, mechanisms like increasing the hours of work cannot generate enough value. As a result, capitalist businesses look for increases in productivity, in order to drive surplus. One issue here is that capitalists are competing for relative amounts of the total social capital realized as profit. If the global economy slows, surpluses stagnate and profitability reduces, the competition becomes more intense. This is one potential mode for analysing the MOOC agenda and the focus of universities in working in joint ventures with educational technology firms, hedge funds, publishers and so on (see Shanley, Swierstra & Wyatt, Chapter 11, in this volume).

Thus, the idea that academic work might be infused with humanism is framed by the recalibration of universities in the sector as a whole, through competition that includes: the generation of knowledge as a commodity for exchange; research outputs as private property; capturing and retaining student numbers,

grounded in new forms of student finance; and the deployment of new technologies to drive teaching and administration efficiencies. Technology-driven recalibration enables labour-time to be reduced in principle. In practice, it becomes the most unfailing means for turning the whole lifetime of a worker and [her] family into labour-time'; enforces the metronomic control of the 'motion of the whole factory'; separates 'the intellectual faculties of the production process from manual labour'; and, is 'continually transforming not only the technical basis of production but also the functions of the worker and the social combinations of the labour process'. (Marx 2004: 531–532, 546, 548, 617)

Crucially, even for academics notionally working in a privileged profession, under capitalist social relations, technology totalizes proletarianization as a form of ongoing immiseration. This forces the individual academic onto a treadmill of constantly needing to upgrade their human capital, in order to generate commodity skills that can be valorized inside competing departments or institutions (Newfield 2010). Whether they can generate these skills or not, they are partially developed individuals, precisely because they become subordinated to the production of 'objective wealth, in the form of capital, an alien power that dominates and exploits' (Marx 2004: 716). Processes of proletarianization include the routinized nature of teaching and research, the imposition of technology-mediated, menial tasks and the reduction of intellectual work to standardized processes. This creates a field of exploitation, inside which the academic is continually alienated from their labour-power and the conditions under which they work (Hall 2018). On an everyday basis, an expanding global circuit of alienation reproduces exploitation, in order to generate relative surplus value.

Thus, academic labour is subsumed under a global production machine, and is further conditioned by policy-discourses. This machinery disassembles existing flows of labour, finance and technology, and reassembles them for profit (Deleuze & Guattari 1983). In this way, capital enforces human-machine interaction as a means to parasitize labour (Wendling 2009: 100). The conditioning of this machinery is important for the widening circuit of alienation that reproduces exploitation. As technologies are reconceptualized as platforms, this circuit is widened out beyond institutions and sectors. Platforms enable users or audiences to be exploited in the production of services that can be commodified, such as the production of educational content or the grading of assessments, or from which rents can be taken in the consumption of those services. In these modes of production, there is a clear division of labour and hierarchy of control, rooted in precarious employment and the need to have ready access to commodities. Moreover, the platform enables controlled access to those services through mediations of commodity-exchange and private property.

These approaches are legitimized at the level of society, through the normalization of platforms that drive cost-efficiencies in transport, hospitality and accommodation. Thus, determinist narratives of technological progress elide

with liberal ideas of equality of opportunity and freedom of access, underpinned by free markets and performance data (Feenberg 1999). Any political refusal of these economic narratives (for instance, in support of academic freedom) tend to be met by cries to reform the sector, based on discourses of efficiency and productivity. Moreover, these narratives amplify intersectional and intergenerational injustices because they reinforce hegemonic norms of excellence, entrepreneurialism and impact that are white, male, ableist and heterosexual, and which enable specific aggregations of human capital (Boyd 2017).

Technology optimizes this across the terrain of academic labour because it structures governable spaces—for instance, through performance data that enables the comparison of individuals, subjects and institutions against imposed norms that are disciplinary. Technologies and techniques of governance optimize performance management and encourage certain behaviours, and this is given regulatory power over individual agency through institutional governance. Optimization is further amplified through new technological compositions, rooted in the idea of the platform, operating as a controlling, distribution infrastructure that mediates between contracting parties. This has been reified as freeing labour from capitalists, so that they can commission work directly (Pasquale 2016). There is a value-based ecosystem that surrounds the platform, emerging from the commissioning of work and the extraction of data about that work, in terms of the fluidity of activities. Drawing individuals to the platform, in order to monopolize data about suppliers and consumers is pivotal, in particular in generating predictive data about future behaviours.

This is important in the context of the University, because the generation of a controlled ecosystem for collecting rent based on the distribution of commodities and for the concomitant accumulation of data about those commodities, enables innovation in knowledge production, circulation and accumulation. In particular, generating analytics or large datasets enables dominant protocols and algorithms to affect learning and teaching, knowledge production and transfer, research impact and so on through cybernetic control (Lazzarato 2014). This offers the opportunity for HE providers to impose flexploitation through the creation of micro-activities or micro-commodities in relation to the production of curriculum content, research outputs, assessments and so on (Morgan & Wood 2017). This transforms academic work because new relations of production are realized in precarious, flexible and part-time contracts that enforce entrepreneurial work in multiple contexts upon individual academics.

A crucial, spill-over issue is that platforms tend to have an embedded epistemic privilege that is reproduced as data based on a specific political economic model, inside which specific users behaving in particular ways constantly provide optimizing performance data (Huws 2014; Srnicek 2017; see Barry, Chapter 5, in this volume). In this process of optimization, individuals have to enrich their knowledge, skills and capacities, and also their attitude and commitment to enrichment and their job, which becomes an alienating labour of

love (Hall 2018). Thus, not only is work proletarianized inside the University, but proletarianization infects the academic's soul. Thus, as Hall (2016) points out, in HE this tends towards the *Uberification* of the University, because knowledge becomes a commodity that is privatized rather than being a social good.

Thus, taking the HE sector as a platform, and individual institutions as ecosystems on that platform, enables us to understand processes of subsumption and proletarianization. The idea that education is for the joy of learning is subsumed under the need to drive value, surplus and profit. As a result, the labour process of education, situated inside disciplinary ecosystems, acts as a mode of domination. Even worse, this mode of domination is reinforced through an evaluative infrastructure, internalized at the level of the individual and aggregated at the level of the platform, in order to provide learning analytics or profiles that relate educational outcomes to tax/income data. At the level of society, platform data collection serves as a mechanism for the control of knowledge production in relation to performance and the expansion of the system of capital. At issue is what this means for the structure and governance of organizations, as a system of capital re-purposes the social relations of work through new forces of production operating as productive and distributive platforms. Is it possible to invert these new formations, in order to re-purpose and reimagine the University?

Discontent and the Re-imagination of the Institution

The proletarianization of the University is predicated upon atomized competition, which utilizes new forces of production to reshape relations between people, in order to extract value. A critical element of this is enforced separation between individuals, and the ability for individual agency to be repurposed by structural requirements. However, in order to extract maximum value, capital requires individuals to work in concert, or to collaborate as producers, distributors and consumers. This gives opportunities for cooperative re-imagination.

For Marx (1866), the cooperative movement was a transformational force where it understood its relationship to labour as the point of social production. Thus, he argued that producer cooperatives, as opposed to consumer cooperatives, are a manifestation of class antagonism that can point towards 'the republican and beneficent system *of the association of free and equal producers*' (ibid., emphasis in the original). This analysis of cooperation rests on forms of self-mediation by human beings of their material activities in society. In an idealized cooperative state, activities are no longer piecemeal or solitary, or governed by capital; rather, they are governed by alternative networks of solidarity and purpose: 'This is not possible without the community. Only within the community has each individual the means of cultivating his gifts in all directions; hence personal freedom becomes possible only within the community' (Marx & Engels 1998: 86).

A focus on the communal and associational characteristics of cooperation is critical to Marx's praxis, because in them he sees the individual developing

the capabilities of their species (Marx 2004). As a result, a refocusing upon cooperative values and principles, grounded in the conceptual framework of the self-in-association, acts as a moment of refusal of alienated socialization, in which the producers of society are estranged from both the means and conditions of production of that society. However, discontent at the present state of things does not coalesce into a single, counter-hegemonic position, predicated upon a unified collection of alternative governing principles for life. It therefore becomes important to think about alternative forms of knowledge production and an integration with alternative conceptions of mutuality, solidarity and cooperation, such as those emerging from indigenous or marginalized communities.

Indigenous methodologies or modes of being help *both* to develop a fresh focus on knowledge *and* to reframe the idea of movement towards a more humane social production as a liminal process, engaging the body, emotions and cognition (Tuhiwai Smith, Tuck & Yang 2018). In this sensuous, epistemic opening, knowledge is rooted in people, place, philosophy, values, communities, axiologies and cosmologies, which generate 'relational accountability' (Wilson 2008: 77). Such accountability is mutual, respectful and dignified, and acts as a beginning for refusing the domination of knowledge from the global North imposed as progressive and rooted in an ideological, evidence-based epistemological standard. Here, cooperative techniques for social reproduction might enable forms of relational accountability between peoples and places. Moreover, in this process, they offer the possibility of liberating material forces, including technology, and connecting them to alternative conceptions of the world, in order to widen autonomy and freedom.

For Marx (1866; 1970) a cooperative revolution in the governance of technology forms a crucial strand in changing the general conditions of social production, because it redefines the subjectivity of society towards humanity and away from the commodity and the valorization of capital. If we are to do this, then a shared, associational expression of individual lives is required, in order to realize the essence of what it means to be human. Marx's idea was that the expression of my life and those of my peers are immanent to each other, and should be mediated directly rather than through the market, private property, the division of labour and commodity exchange. This requires an alternative conception of how to integrate the forces of production into our communal being, and a liberatory conception of how those forces are subordinate to our essence and our social relations (Bookchin 2005). Beautifully, Marx (1844) argues that through such practices 'our products would be like so many mirrors, out of which our essence shone' as a 'free expression' of our lives.

At issue is how to find cracks in the system of capital, into which technologies for alternative, liberatory conceptions of society can be inserted. Dunayevskaya (1958) has argued that these need to be situated inside organizations that are beyond value-production, or they risk degenerating under competition. As a result, a re-imagination of the University has to engage with more than the cooperative possibilities of the collective ecosystems currently structured to reproduce value. A re-imagination of the potential for forces of production

to enable social connection and knowledge sharing, and to liberate time for autonomous activity rather than the imposition of commodity production, comes up against structural contradictions. Thus, a re-imagination of technology as a means for liberating knowledge for a new society demands a new material literacy as a radical, pedagogical project at the level of society.

This is a transitional project that critiques the place of technology as it is currently instantiated inside the University. It critiques the relationship of the digital University, and its techniques of governance, to knowledge production and the generation of social wealth. It also critiques these relationships and techniques in terms of their ability to enable humanity to engage with global economic and environmental crises. It critiques the limitations in our collective ability to produce knowledge inside the University to engage with these crises, in part through the separation of polity and economy, such that the latter dominates the former. It critiques these limitations as they are reproduced inside organizations conditioned by the State to generate value through exploitation and expropriation. In this way, it moves beyond the fetishization of technologies and techniques, including the ways in which these are reproduced and enclosed inside institutions like universities (see Ampuja, Chapter 2, in this volume). The potential for relational accountability and the recomposition of peoples, places and technologies offer an alternative set of possibilities for intellectual work beyond the capitalized University.

In moving beyond forms of fetishization and enclosure, this points towards a humanist reimagining of what it means to learn, teach and produce socially useful knowledge (Neary 2011). Here, we have examples of alternative conceptions of technological sovereignty, such as the Cybersyn Project of Allende's Chile, which sought to reimagine society through social networks that connected 'technologies to the function of the state and its management' (Miller Medina 2005: 22). Even as these projects are co-opted for value, they articulate the potential: to question hegemonic governance; to hear previously expropriated voices from the margins; to reveal the narratives of exploitation from the precariously employed; to question dominant narratives about socially useful knowledge and technologies and their co-option inside alienating institutions; and to share the full range of knowledge, skills and capabilities. What, then, is the role of technology in enabling cooperation as a pedagogical practice that first reimagines the University and then dissolves it into the fabric of society?

Platform Discontent as a Social Movement

Bookchin (2005) argued that a liberatory technology demands a liberatory praxis. Possibilities emerge from critiques of platform cooperativism, which point towards the possibility for cloning the technological heart of emergent, digital platforms. The point of cloning these is to break their extant focus upon value, and upon the technologically mediated commodity-exchange that

shapes social relations and distorts human essence. The onus is on redesigning the governing principles and ownership structures of these platforms, alongside the algorithms upon which decisions are made about the privatization of service-provision, performance information about individual sellers and consumers, and enabling access to services. This offers the potential to shift the discussion about the redistribution of social goods and services, and to discuss technological sovereignty for citizens rather than corporations (Platform Co-operativism Consortium (PCC) n.d.; Scholz 2016).

Cook (2013) highlights the intersection of cooperation, academic practices and technology as a critical point of discussion, in enabling cooperative capacities to be developed. The academic experience of platform technologies is uncovered in terms of both hard and soft technologies. While the former might include software and hardware in its traditional forms, the latter focuses upon the shape of governance processes, regulation, company organization, approaches to credit, the law and so on. The integration of hard and soft technologies enables a discussion of technological sovereignty designed to enable cooperative vision, practices and organizational models. In responding to critiques of actually existing alternative spaces for moving beyond the University, this would pivot around:

- ensuring governance through the democracy of member control;
- a refusal of the division of labour, which separates students and academics based on privilege and status;
- sharing narratives that challenge the fetishization or mythologizing of certain practices and relations that are painted as utopian; and
- the establishment of an explicitly politicized relation of individuals to their academic labour, knowledge production and broader communities.

In moving beyond the fetishized models, and in integrating technologies for alternative social imaginaries, reimagining intellectual work moves centre stage. For Marx (1993; 2004), this emerges from the constant need by capital to dominate labour, such that it can extract the creative powers (skills, knowledge and capabilities) of humans and instantiate them inside machinery or technology. It seeks to transform the intellectual power of people working cooperatively, so that it can control those powers, diffuse them across a social terrain of production and revolutionize the costs of intellectual production. In discussing this in terms of capital's control of the general intellect of society, Marx (1993; 2004) was clear that self- and cooperative development would be dominated by value and valorization, and that the need to produce solely for exchange-value would set individuals against each other because they had different political conceptions of life. Moreover, as capital seeks to generate new forces of production by enclosing socialized labour-power, and innovating both science and technology, this generates forms of privilege and power for those who can manage or create such innovation.

This is important in our analysis of how technology enables human activity for a particular value-based conception of life, because human relations with each other and with nature are predicated upon particular forms of socialized production that disable humanity. Disabling processes are reinforced by the accumulation of the skills, capabilities and knowledge of the social individual inside machinery, where it becomes an alien power reinforced by hegemonic perceptions of technology, exacerbated in discussions of performance data, artificial intelligence, smart systems and so on. Value-driven, societal intelligence embedded in technology disables the individual from thinking critically about their experience in society. Instead, individuals are forced to consider how to survive as their labour is annihilated through capital's innovation in technology. Thus, education focuses on employability and entrepreneurship, in order to enable individual survival (including, as Ampuja notes in Chapter 2, in this volume, in the context of the positivism around digital innovations that serves as uncritical fetishism).

One of the possibilities that emerges from a more humanistic analysis, rooted in the idea of a renewed educational project that is cooperative and grounded in direct association, is that people might be able to use cooperative techniques and technologies to develop forms of mass intellectuality. This is the production of socially useful knowledge as new forms of collective wealth, open to all to draw down upon, and which demonstrate relational accountability between peoples, places and times. Thus, techniques need to be uncovered that liberate the general intellect from the law of value, and that recast technologies as a means of mass production of social necessities, which in turn widen the spheres of autonomy and freedom. This questions human richness in terms of the accumulation of commodities, and instead redefines that richness, or a rich life, as one that is free to work with and contribute to general, social knowledge, skills and capabilities, which are governed and distributed directly through association.

In this process of governance and distribution, socialized, cooperative technologies are crucial. However, socialized, cooperative pedagogies and educational techniques are equally important. Thus, the possibility for alternative, cooperative forms of HE, incubated both inside and outside the University, might act as a staging post in a transition away from the law of value and the enclosure of human capabilities. The characteristics of such a University depend upon overcoming alienated socialization, and instead working for technological sovereignty for all citizens—for instance, through: the development of global, intellectual commons; the deployment of cooperative, open architectures and data; and the facilitation of communal deliberations for socially useful service-production. Platform ecosystems, repurposed as joint associations, rather than joint ventures, move us culturally and materially towards an analysis of what is socially useful beyond the market. This is a pedagogical project, which might be incubated inside institutions, but can only have meaning at the level of society.

This demands social dialogue about the extent to which the general intellect has been expropriated from us and turned against us for exploitation. It forces us to question the spaces inside which this has happened, including the University, in order to discuss whether it can be liberated as a form of mass intellectuality (Hall & Winn 2017). This is a revolutionary moment that rest upon a ruthless, negative critique of the relationship between technology and the University, and their combination as a platform for exploitation and expropriation. Such negativity enables us to reimagine technology as it 'lays bare the mode of formation of [our] social relations' (Marx 2004: 493), in order to redefine those social relations. Only in this way might the example of technology and the University, as an exploitative platform, and of HE as an ecosystem of exploitation that enables further expropriation, be used as 'a regenerative cultural force' (Trocchi 1963). In a redefinition pointing beyond the University, mass intellectuality at the level of society might be revealed as a new form of associative intelligence (MacPherson 2007: 372).

Beyond the University

Is it possible to imagine that another University is possible, as a staging post in imagining that another world is possible? Is it possible to reimagine the University as a node in a transnational network of cooperatives seeking to create a solidarity economy that can enable autonomy in the production, distribution and consumption of life? Is it possible to do this work while it is conditioned by the economic imperatives of the State, which continue to deform governance and management in a highly marketized, commodified and competitive educational system? Is it possible to aggregate this work inside and beyond the classroom and curriculum? Is it possible to connect: our concrete, historical examples of the alternative social uses for technology; our existing, open knowledge commons; revolutionary pedagogies with the potential for self-mediation or *Bildung* (see Shanley, Swierstra & Wyatt, Chapter 11, in this volume); narratives of indigenous and marginalized voices that enable new conceptions of life to emerge or be shared; and socially useful knowledge, explicitly designed to work for solutions to global crises? The integration of these moments of technology, knowledge, history, material production, cultural innovation and institutional renewal reminds us of the need to centre living, historical subjects. This humane subjectivity pivots around the democratic production of knowledge as a means for generating new principles for living and livelihood as a function of mutualism and solidarity (Neary & Winn 2017).

The generation of new principles for living can be reimagined as techniques for developing an alternative set of relations, which give full access to both the means of subsistence or the realm of necessity, and the realm of freedom (Marx & Engels 1998). Such techniques, amplified through the liberation of technologies for cooperation as opposed to value-production, in which sovereignty in

hardware, software and soft technologies lies in communal deliberation and in citizenship, enable us to redefine our experiences as social workers. Our ability to move beyond the University, to enable learning and sharing across a distributed, autonomous federation, can only be enabled technologically.

Here, there is a need to accept the limitations of the ideas of the platform, as currently conceived. Platform-based learning tools, or distributed learning networks acting as ecosystems, are governed by specific algorithms and the extraction of data for commercial ends that are *both* funded by finance capital *and* regulated by corporate forms. Where these approaches are deployed inside educational institutions, those organizations are implicated in the dismantling of established social relations, because the commodification of information, content, data and services estranges our knowledge, skills and capabilities from us. Moreover, this estrangement or separation occurs as an ongoing process. The issue then becomes whether the platform, funded and governed as a joint venture, can be repurposed for associational ends against and beyond the law of value. Can pedagogical counter-projects liberate *both* knowledge *and* the technological platforms upon which that knowledge is created and shared in the name of an alternative conception of life?

A radical, negative critique of the platform picks up on Marcuse's (1998) argument that technics and modern technology have the ability to shatter and then recompose the specific historical form in which they are deployed, in the name of liberation. There are already failed examples from which we can learn. For instance, the Ecuadorian Plan for Good Living (NSPD 2013) was attempting to blueprint the ways in which education might be transformed through participative practice, in order to generate socially useful forms of knowledge in science, technology and innovation that would reinforce and diversify both individual and social capabilities. This echoes previous reimaginings of the role of really useful knowledge produced communally, collectively and cooperatively, which emphasized the work of radical, working-class organizations like the Plebs' League and the Oxford Central Labour College, and labour movement plans like the Lucas Workers' Plan for socially useful production. Such moments of production, rooted in knowledge at the level of society, begin from a democratic analysis of the conditions of social production, and a focus upon militant research undertaken in public. Socially useful production stands against the inhumanity of value, and is grounded in the general, productive knowledge, skills and capacities of society, or its mass intellectuality as a platform for intellectual work.

The intersection of technology, knowledge production as mass intellectuality and the reality of alternative, societal conceptions of HE offers academic labourers who are struggling under proletarianization, precarious employment, ill-health and overwork the potential for radical democracy in relation to education, knowledge and academic practice (Amsler 2015). It refuses the University-as-is, and imagines new associations for socially useful production. The platform reimagined for direct association between producers, grounded

in justice and equality, is essential here. It enables what Marx (2008) highlighted as self-government for the producers, predicated upon human liberation away from alienated labour. In this mode, communal sovereignty over technology and techniques for self-government is the real movement towards cooperative self-mediation:

> If co-operative production is not to remain a sham and a snare; if it is to supersede the capitalist system; if united co-operative societies are to regulate national production upon common plan, thus taking it under their own control, and putting an end to the constant anarchy and periodic convulsions which are the fatality of capitalist production – what else, [], would it be but communism, 'possible' communism? (Marx 2008: 50)

This is the potential for intellectual work, realized as platform discontent against and beyond the University.

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CHAPTER 8

The Technological Imaginary in Education

Myth and Enlightenment in 'Personalized Learning'

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Enlightenment, understood in the widest sense as the advance of thought, has always aimed at liberating human beings from fear and installing them as masters.

Yet the wholly enlightened earth is radiant with triumphant calamity.

Horkheimer & Adorno, *Dialectic of enlightenment* (1947/2002: 1)

Introduction

From the printing press to personalized learning, new pedagogies and technologies, each in their time, have been configured in remarkably similar ways in educational discourse: they are seen as overcoming political compromises, human failings, even the 'dark' ways of the past; and they are regarded as ushering in

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a kind of pedagogical utopia of natural, authentic, even playful teaching and learning. This in turn gives *the present* a sense of urgency. *It*, in turn, is portrayed as a time when action, investment and change—often unprecedented in scope and scale—are all urgently needed. And just as the past is described in terms of its failings, brokenness and incompletion, the future is characterized by its totality, completion and finality. Consider a 2014 report of The Learning Analytics Workgroup: *A report on building the field of learning analytics for personalized learning at scale* (the 'LAW Report'). Early on, it accuses 'educational institutions (at national, state, district, institutional, departmental, and course levels)' of '"driving blind," with weak feedback loops to evaluate the impact of ongoing practices or changes that are implemented in their practices' (2014: 16). At the same time, however, it emphasizes that there 'are urgent and growing national and global needs for the development of human capital, research tools and strategies, and professional infrastructure in the field of learning analytics and education data mining' (2014: 17). It concludes these and other arguments by stating: 'The endgame [for these efforts] is personalized cyberlearning at scale for everyone on the planet for any knowledge domain' (2014: 17).

The personalized 'cyberlearning' technologies promoted in this report promise to customize instruction for individual learners using 'analytics'—the automated analysis of vast quantities of user data—much like Facebook and Google customize their feeds and results based on *their* users' histories and profiles. Such technologies are first seen as urgently needed to fix the outmoded management and practices of educational institutions at various levels. Elsewhere in the report, personalized learning technologies are portrayed as helping to meet the first of a handful of 'grand challenges' identified by the National Academy of Engineering (NAE 2020) as necessary 'to sustain and improve the human condition' (2020: 12): 'Given the diversity of individual preferences, and the complexity of each human brain', the NAE writes, 'developing teaching methods that optimize learning will require engineering solutions of the future' (NAE 2020: 45). Significantly, such 'teaching methods' are seen not as matters for teachers or even for education as a whole to address, but as a problem for engineering to 'solve'. And such engineering problems demand unprecedented action, as the Law Report has already emphasized. It continues: 'Failure to support this effort or delaying its initiation will [result in] losses to the intellectual diversity and value of our graduates to the workforce and society at large' (LAW 2014: 12).[1] The vision for the future that these technologies promise to fulfil, moreover, could not be any more total: their global availability to every man, woman and child, and for any topic that they might wish to learn.

Very similar hopes were held out for books and the printing press after Gutenberg's groundbreaking invention almost 500 years ago. Johann Amos Comenius (1592–1670), little known in the English-speaking world, but seen elsewhere as 'the father of modern education', sounded even more extreme than the LAW Report (if that is possible). First, Comenius emphasized that as a result of the Thirty Years' War (1618–1648), he had seen his 'country, her churches and schools all in ruins' (1668/1938, p. 4). But Comenius was overwhelmingly

optimistic, enormously inventive and influential (so much so that he was said to have been invited to be President of Harvard University[2]). Like many of his contemporaries, Comenius saw the book, recently made much cheaper and more plentiful by the printing press, as the paradigmatic technology for both knowledge and learning. In fact, he had an impressive plan to compose the *ultimate* book—one that would meet the 'grand challenges' of his own difficult time. This book would accomplish the ultimate goal for Comenius, expressed via the Latin phrase *omnes omnia docere*. This is the 'pansophist' (*pan*: all; *sophia*: knowledge) belief that *everyone* is to be taught *everything*:

> This book will be nothing else than a transcript duly arranged of the books of God, of Nature, of Scripture and of the Notions innate in the mind: so that whoever shall read and understand [it] shall at the same time read and understand himself, the nature of the world, and God. Accordingly, it will be a book of the most universal kind[,] setting forth for all men to see all things that are necessary for man for this life and the future life to know, to believe, to do and to hope … In effect, [this] book of Pansophia must be so full and complete that beyond its limits there can be nothing, and nothing can be conceived to be. (1668/1938: 148–149)

In Comenius' time, the world as a whole was generally understood in terms of real and metaphorical 'books'—books of God, of nature and of humankind (see e.g. Foucault 2005: 38–46). Comenius believed that the combination of these books into the ultimate tome would achieve nothing less than the advancement of 'the minds of men' from the 'darkness' of his own time into 'the light … into the one simple way of Eternal Truth' (1938: 4). Needless to say, however, Comenius never completed the fantastic volume he describes in the quote above—although he published a great many others.

The Dream of Education and the Technological Imaginary

Comenius, like the LAW Report after him, thus proposed nothing less than what contemporary educationist Christoph Wulf refers to as 'the dream of education'—'a vision of total educability and formation [which] reached its full development since the start of the modern era' (i.e. in Comenius' time). Wulf continues:

> Human self-empowerment and a growth in human autonomy [are] … the aims of the dream of education; education was first seen as a service to God; later it was to contribute to His effacement. This process was accompanied by an increase in rationality, modernization, and civilization … (2002: 270)

Despite the rationalization, modernization and relative secularization of the world since Comenius' time, the similarities between Comenius' dream of 'everyone learning everything' and contemporary aims to achieve 'personalized

cyberlearning at scale for everyone on the planet' are significant. From the printing press though correspondence education, to our age of the MOOC and personalized learning, the hope that education—via the latest advancements—can meet each and every learner's needs has been expressed in various ways by educators and technologists for centuries. As the examples of Comenius and the Law Report show, this idea was once rooted in a belief of a Christian God, but it has now been secularized through the technological and managerial jargon of 'cyberlearning', 'human capital' and 'feedback loops'.

As they gradually change and evolve, these patterns of thought and belief can be seen to form what has been called an educational and technological 'imaginary' (e.g. Punt 2000; Griffin 2002). This refers to a repertoire of images, visions and dream elements that are seen as a part of a general 'solution' to the 'problem' of education. The 'imaginary' in this sense has been defined as 'affectively laden patterns[,] images [or] forms, by means of which we experience the world, other people and ourselves' (Lennon 2015: 1). The failings of education—and their broader ramifications for the 'human condition'—are thus understood in the technological imaginary as something that can be concretely addressed, often as *engineering* problems to be *solved* 'at scale'.

At the same time, the imaginary is not just a set of privately held thoughts and beliefs; it is instead a common set of visions, values and meanings, shared either informally or tacitly, or in some cases 'crystallized' or solidified into symbols or slogans. And such visions and meanings, whether of an educational utopia, an institutional mission or a singular national character, can be said to form the basis on which these respective communities are unified—whether they be communities of Comenian 'pansophists', of personalized learning experts or of whole institutions or nations. Theorist Cornelius Castoriadis was the first to define the imaginary in this collective sense:

> Once created … imaginary social meanings … crystallize, or solidify, and that is what I call the *instituted social imaginary*. It provides continuity within society, the reproduction and repetition of the same forms, which henceforth regulate people's lives and persist there as long as no gradual historical change or massive new creation occurs, modifying them or radically replacing them by others. (2007: 73–74; emphasis in original)

Although these social imaginary meanings may achieve material form in a flag, or an inspiring slogan or image, in the case of the educational imaginary, they instead often appear and reappear in the form of what might be called idealized images, metaphors or 'primal' scenes that outline what we hope education could or should be. In this chapter, I trace one of these primal and utopian images and scenarios, I show how it has taken on a distinctively metaphorical function in the age of the computer—and how it ultimately has turned into a 'myth' that has become inseparable from utopian visions of a wholly enlightened world. In so doing, I show how mythological and utopian meanings in

Figure 8.1: Comenius' example of one-to-one dialogic teaching as simultaneously the primal and ideal scene of education.

Source: Wikimedia Commons.

the technological imaginary have regulated a great deal of activity in the area of educational innovation, giving it a kind of repetitive continuity that educational innovators generally see themselves as leaving behind.

The Primal Scene of Dialogue

Comenius, in one of his many books—in fact his most famous multi-century bestseller—opens with an illustration of one idealized image or scene that I will trace in this chapter (Figure 8.1). This shows a single master and a boy, and a *dialogue* taking place between them. The master says: 'Come boy! Learn to be wise!" The boy asks: 'What doth this mean, to be wise?' The master, gesturing and significantly positioned in line with the sun and its light, replies: 'To understand rightly, to do rightly, and to speak out rightly, all that are necessary [sic]' (1887: 1–2). Next, the boy asks' 'How?', and the master explains that he will guide the youth, showing and naming all things for him to see—to which the boy answers: 'See, here I am; lead me in the name of God.'

How does this relatively simple, if rather antiquated back-and-forth, represent a utopian scene, an ideal metaphor for education and pedagogical innovation? In what sense does this scenario serve as an ideal, a key reference point for innovation in teaching and learning? This is the case because it embodies an ideal or primal scene not simply for education, but for something even more basic in the human condition—*communication*. Philosopher of media and communication Sybille Krämer explains:

> Dialogue … [can be seen] as the primal scene and established norm of communication, and the goal of dialogue is understanding. Here

> communication is considered an interaction between people, which is dependent on mutual understanding with the help of symbols that convey meaning … Communication [in this sense] represents the basic process that enables coordinated action, which results in the formation of community. It is conceived as a *reciprocal* process of social interaction. (2015: 22, emphasis in the original)

Dialogue as a reciprocal exchange, as a back-and-forth that aims at mutual understanding, is hardly just an elusive ideal. It is something that we experience every day—and has manifest value in this context. Face-to-face communication is privileged and won at great cost for meetings in business, by professional societies (i.e. at conferences) and in school and university classrooms and lecture halls every day. Significantly for this chapter, dialogue or conversation as a kind of 'ideal' is also enshrined in Alan Turing's infamous 'Turing test', which defines artificial intelligence in terms of a computer's ability to successfully 'imitate' a human interlocutor in a kind of dialogue. Turing originally envisioned this dialogue as taking place through typewritten text, and proposed that if the person receiving such textual responses could not distinguish between those sent by a computer and a human, then the computer could be said to be *intelligent*. The implication with both Turing's test and our everyday desire to engage in face-to-face discussion is that such communication has a special authenticity; it serves as a kind of 'touchstone' in the human experience. Face-to-face communication is valued for arriving at a sense of shared reality and agreement; it is regarded as the best way to get at verifiable 'truth' and 'understanding'—especially *common* understanding. According to Krämer, such communication involves 'fostering agreement and creating a unified society whose goal is precisely to overcome distance and difference. When dialogical communication is successful', Krämer continues, 'those who communicate with one another in a sense become "one"' (2015: 22).

Building off this ultimate outcome, Krämer somewhat sardonically refers to this type of communication as 'erotic'—as ultimately aiming at the figurative coupling or unification of the two, the *dia* with the word *logos*. Krämer goes on to explain that this communicative ideal is embodied in the Western philosophical tradition by one person in particular: the 'gadfly' of Athens, the first moral philosopher, and the philosopher who (as Nietzsche points out), didn't *write*—Socrates.

> [F]or Socrates[,] speech is a kind of erotic encounter: it is specifically directed towards a particular individual recipient, and it attempts to establish an intellectual union: a shared insight, a common grasp of language and a reciprocal understanding thus constitute only the flipside of a mutual desire. This makes dialogue an intimate as well as a unique event. (2015: 70)

Figure 8.2: One-to-one tutorial learning *in situ* in Rousseau's *Emile*: 'Let's run fast! Astronomy is good for something.'

Source: Wikimedia Commons.

Socrates, of course, is famous for his dialogues, generally recorded by Plato, the most well-known of his students, and which number more than two dozen. Through his dialogical *method*, sometimes referred to as his *dialectic*, Socrates was able to stump the most confident of his interlocutors. He was also able to teach the most lowly or ignorant. He insisted on engaging with others through the spoken word, and reviled writing as 'inferior to speech', as a weak and

vulnerable 'bastard son' of knowledge. Socrates, however, was not only a philosopher who embodied the dialogical ideal of communication; through his dialogues he is also seen as being a great—if not *the* greatest—*teacher*. Second perhaps only to Jesus of Nazereth, it is Socrates who is regarded as being the paradigmatic educator of the West. His dialogues not only provide a valued philosophical method of questioning and reasoning; they also exemplify an explicitly 'dialogical' method of teaching, one which seeks to draw out the implicit reasoning of the student or interlocutor. Educators still seek to emulate it to this day (e.g. Birnbache 1999; Oyler & Romanelli 2014).

The primal and ideal scene both of communication and of teaching, the dialogue has been developed in many different ways since its emergence in ancient Athens and its reaffirmation in Comenius' time. It is famously revisited by Jean-Jacques Rousseau in the era of Romanticism and the Enlightenment. And it is Rousseau who perhaps did the most to 'modernize' this utopian image, to make it readily recognizable to us today. Rousseau accomplished this in his 1762 novel *Emile: or on education*. It shows how the young Emile learns, not in a classroom or through explicit instruction, but in the countryside by experiencing things of nature directly for himself, as they are relevant to his immediate desires and interests. In all of this, Emile is accompanied by Jean-Jacques, a patient and all-knowing tutor, based on Rousseau himself. The master is always ready for dialogue with Emile, and this often takes place in the most varied contexts—in his village, in the garden and, in one famous instance, in the woods. In the latter, Emile loses his way while walking in a forest with his master (Figure 8.2). As hunger starts to overtake him, Emile begins to cry. His tutor responds: 'Crying isn't what has to be done. What we have to do is find ourselves' (1979: 181). Jean-Jacques then reminds Emile of an earlier conversation on astronomy where they learned about the direction of shadows cast by the sun. They had also learned about the relative position of the forest vis-à-vis the town. Emile then works out the direction of the town, and catching sight of it, cries: 'There it is straight ahead of us in full view. Let's have lunch! Let's dine! Let's run fast! Astronomy is good for something' (1979: 181).

Rousseau's emphases here are not very different from those of today's experiential, discovery and authentic methods of teaching and learning. They are also reminiscent of contemporary constructivist or even 'gamified'[3] education: in all cases, the student learns in an authentic setting, through free exploration, based on what is of immediate interest to him or her. Constructivists would say that Emile is effectively constructing knowledge based on his personal experiences to solve authentic problems. Gamification advocates would approve of the immediate reward he receives for his success: a warm dinner. In this sense, Rousseau captures what today is still a utopian ideal of education—one that many teachers regard as most desirable for their students, and that technologists would like to see as the outcome of their research and designs.

The problem with this ideal, of course, is the fact that it is not, in contemporary terms, 'scalable'. Parents and educational systems generally cannot afford

to have a learned master with a single child, patiently waiting for the right moment to teach one lesson, and constantly adjusting to the child's mood, inclination and desires. Rousseau's vision was for an elite few—if it was intended for direct implementation at all. Others coming after Rousseau can be seen to have tried to address this challenge. Perhaps most famously in the first half of the 20th century, John Dewey advocated for the inclusive and democratic education of the masses. And he can be said to have done so specifically by expanding the idea of dialogue to encompass the whole classroom or school, which he believed should be manifest as 'a genuine form of active community life, instead of a place set apart to learn lessons' (1915: 11).

Educational Dialogue as Metaphor: The Advent of the Computer

Despite Dewey's enormous productivity and influence in the first half of the 20th century, the image of dialogue was to reappear with a vengeance only in the *second* half of this century. This happened specifically with the advent of the electronic computer. This new technology came to prominence mid-century with the Second World War, where computers had helped break secret codes and calculate the trajectories of rockets and other ballistics. At this time and in the decades that followed, computers took the form of 'mainframe' behemoths, filling entire rooms, accessed through one or more terminals. They were perceived in the general public as electro-mechanical 'giant brains', capable of incredible feats of mental power (see e.g. Edwards 1996: 158–165).

It didn't take very long for researchers to begin to imagine the educational potential of these giant brains. As one might expect, the very first visions of the computer's role in this context reflected the dominant instructional doctrine of the time. This was *behaviourism*, and its most prominent advocate was B. F. Skinner, who had been working on what he called 'teaching machines'. Before mainframe computers became readily available to researchers, Skinner (and other innovators) had developed complex tabulation-style machines with gears, pulleys, paper disks and 'ticker tape' that would ask students questions and would allow the student to progress only with the correct answer. Based on his theories of stimulus and response, Skinner hoped these machines could teach students the widest variety of school subjects—ultimately rendering most of teachers' instructional activities obsolete.

At a 1958 conference entitled 'The art and science of the automatic teaching of verbal and symbolic skills', however, Skinner and a range of other 'teaching machine' enthusiasts learned of a different and much more flexible 'machine' for teaching. They learned how an IBM computer had been used to 'simulate' the functions of the teaching machine and that it could simulate many other similar interactions. And it did all of this, moreover, without the many complex moving parts of a literal 'machine' (see e.g. Dear 2017: 22). This flexibility and

the wider perception of computers as giant brains soon led other researchers and developers to imagine these devices not as machines for teaching, but as teachers or tutors in their own right. The computer, researchers came to see, could take the place of Rousseau's responsive tutor, of Comenius' wise master, and of the patient but agile questioning of Socrates. This was clear from the names or acronyms they gave their projects—ones which could not have been any more primal or archetypal in their allusions. They borrowed the names of the great thinkers and teachers of ancient Greece, most prominently PLATO (standing for: Programmed Logic for Automatic Teaching Operation), Plato's own student, Aristotle (who in turn taught the military genius Alexander the Great) and, of course, SOCRATES (System for Organizing Content to Review And Teach Educational Subjects) himself. Through names like these, researchers and advocates can be said to have elevated the primal scenario of the patient tutor and the learner to the level of a dream for what was then high-technology education, and to have turned it into a potent *metaphor*. It no longer had to be a literal tutor or questioner: through the computer, the image of the educational dialogue was freed to be applied to the wisest range of experiences and procedures.

For example, in 1966, Stanford philosopher Patrick Suppes published an article in *Scientific American* entitled 'The uses of communication in education'. Suppes began by explaining that 'the truly revolutionary function of computers in education' lay 'in the novel area of computer assisted instruction' (1966: 1581). At this time, this involved ordering information and questions presented to the student through a type of branching 'teaching logic' (Bitzer, Lyman & Easley 1965: 1) in which either the student or the system would select various paths through a lesson (Figure 8.3). Material would be presented (e.g. using the electronic 'book' or slide selector in Figure 8.3) and questions asked and answered (using the 'electronic blackboard'). Different paths or options were made available for accelerated progress, moments of review and remediation, and more. Anticipating later visions of 'personalization' experts, Suppes emphasized that his vision of the function of computers in education was ultimately about the *individualization* of instruction:

> The single most powerful argument for computer-assisted instruction is an old one in education … individualized instruction … [I]ndividualized instruction became the core of an explicit body of doctrine at the end of the 19th century, although in practice it was known some 2,000 years earlier in ancient Greece … It is widely agreed that the more an educational curriculum can adapt in a unique fashion to individual learners—each of whom has his own characteristic initial ability, rate and even 'style' of learning—the better the chance is of providing the student with a successful learning experience. (Suppes 1966: 207–208)

Referring specifically to the great philosopher Aristotle and his tutoring of the young Alexander the Great, Suppes boldly predicted that 'in a few more years

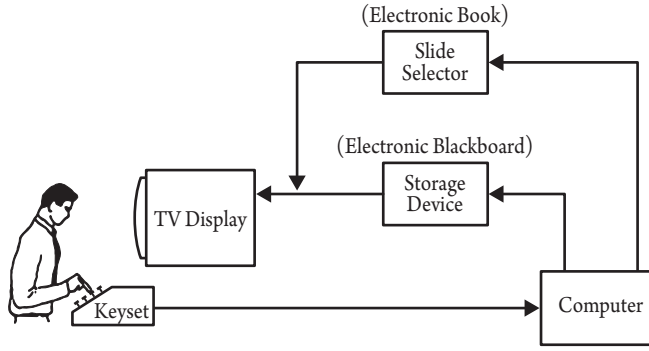

Figure 8.3: Individualized Instruction in PLATO in 1960.

Notes: 1960 diagram showing one user interacting or 'dialoguing' with the multi-user PLATO tutorial system: 'The rules governing the teaching process [are] referred to as a "teaching logic."' One of these was known as an 'inquiry logic' which 'permit[ted] dialogues between the student and the computer … To solve [the problems presented, the student] must request and organize appropriate information from the computer.' (Bitzer, Lyman & Easley 1965: 1–2).

Source: Author's reconstruction based on diagram provided in Dear (2017: 62).

millions of schoolchildren will have access to what Philip of Macedon's son Alexander enjoyed as a royal prerogative: the personal services of a tutor as well-informed and responsive as Aristotle' (1966: 207). Suppes' vision came to be crystallized or solidified in the phrase an 'Aristotle for every Alexander', and—given Alexander's remarkable military successes—this phrase is one that has had particular longevity in discourses of military training. For example, a 2011 article on the ADL (Advanced Distributed Learning, an ongoing international research and development project led by the US military) speaks glowingly of the possibility of 'an Aristotle for every' warfighting 'Alexander'. The article also envisions this technology 'evolving to a future, envisioned by researchers in the 1960s … [in which l]earners and the computer in this future will engage in dialogues not unlike those used for the first 100,000 years or so of human existence' (Fletcher 2011: 152). Here, again, the primal and ideal scenario of an intimate interaction, a mutual interchange between two individuals—whether literal or metaphorical—serves as the basis for imagining the potential of high tech for education.

PLATO, a multi-decade project starting in 1960 and reaching to the mid-1980s, was the largest and most successful of these 'visions' for the use of the mainframe technology in education. The way that PLATO was conceptualized and promoted closely fits the pattern set by Comenius in the 17th century and that reappears in our own time in discussions of personalized learning. Daniel Alpert and Donald Bitzer, who founded the project in 1960, wrote in *Science* that there

> … are growing demands for more mass education over a larger fraction of the human life-span, and demands for more individualized instruction tailored to the specific preparation and motivation of a given student. However, these expanding educational needs have not been matched by increases in the productivity of the educational process. Rather, the costs per student at all levels and in various types of institutions have been rising so rapidly as to cause serious concern for the future. (1970: 1582)

For Alpert and Bitzer, as for Comenius and later, the Law Report, the recent past represents a time of need—a time when the solutions envisioned for the future were either impossible or prohibitively expensive. Contemporary technological developments, in this case, computer-aided instruction, was seen to offer an opportunity to rectify this: 'Computer-based education absorbs the attention and encourages the total involvement of students at all age and grade levels. Its interactive nature has captured the enthusiasm of students and teachers', Alpert and Bitzer boast (1970: 1581). The future, moreover, offers even greater possibilities for education, culminating in a technologically enabled utopia of large-scale individualized tutoring and learning, as Bitzer confidently predicted in 1975: 'My forecast, based on our present plans, calls for, by 1980–1985, a million-terminal network, consisting of two hundred fifty central processing systems all tied together [and] communicating with each other' (as quoted in Dear 2017: 401). Needless to say, Bitzer's ambitious vision of a networked million-user educational utopia was not to be. By the time the 1980s arrived, it was the *microcomputer* rather than the mainframe that was capturing the imagination and enthusiasm of educational technologists and the general public (e.g. Papert 1986). The attention of the educational technology field and its funders and educational technology projects and funding followed suit.

SOCRATES, finally, is a short-lived project that was developed as an alternative to the then-dominant PLATO model. As Brian Dear writes in his history of the PLATO system, the use of the name 'Socrates' for this competitor was very deliberate: 'a more blunt statement about PLATO is hard to imagine: in ancient Greece, Socrates was Plato's "*teacher*"' (2017, p. 112, emphasis added). 'The developer of SOCRATES, Larry Stolurow, developed SOCRATES as a result of the frustrations [he] had with PLATO' (Dear 2017: 112, see also 113–115). Despite Stolurow's own substantial plans for the project, the very ambition and complexity of its technological and pedagogical designs brought it to a relatively rapid end.

Tutorial Dialogue and the '2-Sigma Experience'

Common to all of the projects and predictions described up to this point are visions of legendary, and in a sense, mythological teachers and their teaching, of the primal educational power of dialogue and the ability of the computer to

simulate or mimic these. In the context of these efforts, 'repetition and continuity', to borrow Castoriadus' terms, are not only evident over the decades, but one could say, also over the centuries and millennia that connect them with the cultural and historical 'mythology' of Socrates, Plato, Aristotle or Alexander the Great. And despite the ambitions of figures like Suppes, Bitzer and Storlurow to envision a radically different future based on the latest technologies, age-old continuities still can be shown to 'regulate [these] peoples' lives' and thinking, as Castoriadis put it (2007: 96). The computer is envisioned in these cases, for example, neither as an environment for programming or 'computational thinking', nor primarily as one for communication or social learning (as John Dewey might have preferred). Instead of these and myriad other possibilities being brought to the fore, it is the age-old scenario of tutorial dialogue that can be said to capture and even confine the understanding of the computer's potential in education among these technological innovators.

However, as Castoriadis also observes, these 'repetitions and continuities' may 'persist … as long as no gradual historical change … modif[ies] them' (pp. 73–74). One gradual and slight modification in the metaphors or vocabulary of the technological imaginary of education is indeed important. It can be said to date back to an article published by Benjamin Bloom (of Bloom's taxonomy) in 1984. Here, Bloom compares the findings of two dissertation studies undertaken by his own students. Both of these studies compared three different 'conditions of instruction': the 'conventional' classroom, 'mastery learning' (in which formative assessment is combined with conventional conditions) and, finally and most importantly, individual or small-group 'tutoring'. In this last context, students 'learn the subject matter with a good tutor for each student … [giving] feedback-corrective procedures and parallel formative tests' (Bloom 1984: 4). As might be expected, the results for tutoring appeared to be notably better than what 'conventional' conditions of instruction were able to produce. In fact, these results were '2 Sigma' or two standard deviations higher than the alternatives. Although the rigor of the dissertations cited by Bloom and the validity and relevance of his 'two sigma' finding are now widely questioned,[4] Bloom characterized his finding as being of the greatest imaginable importance:

> The tutoring process demonstrates that *most* of the students do have the potential to reach this high level of learning [i.e. two standard deviations better than conventional achievement]. If the research on [this] problem yields *practical methods* … it would be an educational contribution of the greatest magnitude. It would change popular notions about human potential and would have significant effects on what the schools can and should do with the educational years each society requires of its young people. (Bloom 1984: 4, emphases in original)

Bloom himself did not speculate on exactly what kind of 'practical methods' could be used to address this grand research challenge. However, it did not take educational technologists long to see how new tutorial programs and related

technological innovations could provide the kind of instructional methods Bloom was calling for. Thousands of publications have cited Bloom's article since it first appeared. But it is especially in recent years that Bloom's expansive declarations have been come to play a pivotal role in the discourse supporting the implementation of personalized learning.

One notable example is an article from the McKinsey Institute, which presents a strikingly revisionist history of the role of Bloom's famous article in the study of individualized or personalized learning:

> Research into personalized learning first emerged in 1984 when the educational psychologist Benjamin Bloom challenged the academic community to replicate, at scale, the effectiveness of one-to-one or small-group tutoring. As technology has become more effective and less costly, Bloom's ideal seems, for the first time, attainable for all students. (Rawson, Sarakatsannis & Scott 2016: n.p.)

Although it is clear that attention to 'personalized' learning in any generic sense began long before 1984, Bloom's findings now have a foundational, paradigmatic role in discourses of personalized learning. Facebook's 'Chan-Zuckerberg Initiative' (CZI), for example, is spending hundreds of millions of dollars to adapt their social media platform to personalized learning. In this effort, their spokespersons have referred regularly to Bloom's challenge as the two sigma 'benefit', the two sigma 'opportunity' or even the two sigma 'experience': 'How do we create these kind of [two sigma or tutorial] learning experiences and these kind of learning environments at a scale, at a cost we can afford?' as one CZI advocate recently asked. 'The core question of personalized learning' in this case, is simply 'how to scale that kind of two sigma benefit' (as quoted in Vander Ark 2017 n.p.). Here, the ideal, the dream of the effective tutorial dialogue, has been effectively 'solidified' or 'crystallized' in the form of a phrase that has been stripped of any cultural-historical specificity, but which is buttressed by its association with Bloom and by an aura of statistical and scientific certainty. Indeed, there is even one initiative that has taken on this crystallization as its own name. It is called '2 Sigma Education', and it seeks to achieve 'a high level of one-on-one instruction—without additional staff'—for example, through the use of 'proven, personalized learning software [and] real-time tracking of student progress' (Hebrew Academy 2018).

Conclusion: Myth and Enlightenment

The repetition and variation of the ideal situation of the one-to-one communication of tutor and student, of a dialogue between a learner and a wise master, has thus appeared and reappeared for millennia in the imagination of educational reformers and innovators. Socrates refused to use writing and instead

insisted on engaging with others more directly in his dialogues. His method was recorded by Plato, and has been studied and emulated over centuries of Western history—with teachers today still regarding it as important and valuable. Over time, this dialogic scenario has come to take the form of a kind of ideal case, a utopian image, a ready point of reference for thinking about what education could or should be like. Through the simple act of its repetition, one could say it has come to be surrounded by an aura of reverence and even mystique.

Experience readily confirms that face-to-face communication, as mentioned above, is indeed the way in which we arrive at agreement, unite in common understanding and get at 'truth' that can be verified and shared. Perhaps Sybille Krämer's idea that there is something 'erotic'—a desire for direct and embodied presence—associated with this communication is in some senses not so far off. The paradigmatic and ubiquitous phenomenon of conversational communication has been widely studied, both in education and elsewhere. It has been studied in classrooms, in everyday life, in terms of the pragmatics of information transmission and dialogue simulation, even in philosophical (e.g. Peters 2001) and theological (e.g. Buber 1971) terms. In high-tech settings, specifically in the form of the Turing Test, one-to-one dialogue has even been privileged as the ultimate way to judge whether a computer can be said to be 'intelligent'. But no one approach has explained what happens in dialogue in terms that are entirely quantifiable, or in the form of a predictive or generative theory that stands as any kind of 'final word' on the matter. Dialogue, in other words, cannot be reduced to the requirements and use-cases of engineering nor the certainties and probabilistic measurements of the natural sciences. Yet, we engage in it every day. Dialogue, in short, is a ubiquitous yet irreducible experience.

Given its character as something common yet nebulous, something primal but also potentially high tech, dialogue—at least in the imaginary of educational technology—can be said to have taken on the character of a *myth*: myth, after all, is defined as 'a usually traditional story of ostensibly historical events that serves to unfold part of the world view of a people or explain a practice, belief, or natural phenomenon' (Merriam Webster). Except that in this case, the traditional story of dialogue at the centre of human evolution and Western culture is used not to explain a belief or natural phenomenon, but to justify efforts in the ongoing reform and development in education. It has become part of the 'world view' of successive generations of educational and high-tech innovators and promoters. As Hans Blumenberg (1985) has explained, myths of this kind are based on 'fundamental patterns'—in this case, those of the everyday experience of conversation—underlying 'human existence'. This pattern, Blumenberg says, is

> … simply so sharply defined [*prägnant*], so valid, so binding, so gripping in every sense, that they convince us again and again. [Even further, they] still present themselves as the most useful material for any search

> for how matters stand, on a basic level, with human existence. (1985: 151–152)

This particular understanding of myth is rather different from the 'myths of e-learning' that I and others have identified in the form of incorrect or unproven assertions about technology and learning (e.g. the myth of learning styles or of the millennial learner; see Friesen 2008). Instead, this conception of myth is inextricably intertwined with *enlightenment*—at least when the latter is 'understood in the widest sense as the advance of thought', as Horkheimer and Adorno describe it (1947/2002: 1). Myth in this sense can be said to underpin and legitimize the most scientific, high-tech and in this sense 'enlightened' projects and visions. Defined in this way, enlightenment does not 'dispel myths' or 'overthrow fantasy with knowledge' (ibid.: 1). Instead, enlightenment in these cases turns back on itself in a sense, developing and refining its own mythology to explain and justify what lies beyond that which can be scientifically or technically specified, predicted or modelled. 'Myth', as Adorno and Horkheimer further explain, 'is already enlightenment, and enlightenment reverts to mythology' (ibid.: xviii). Ultimately, they conclude, 'the myths which fell victim to the Enlightenment were themselves its products' (ibid.: 5).

Enlightenment, in other words, which was at first seen as an antidote to mythology and superstition, falls under the spell of 'myths' that it has itself generated, and that for many have become indistinguishable from it. This chapter has shown how this can be understood in the context of dreams of 'dialogue' as a paradigm for education—whether it is explicitly supported by 'high tech' or not. This can also be said to be found in the consumerist 'mythology' surrounding new iPhone releases, or the fascination in educational technology with devices and possibilities 'just around the corner' (e.g. in the form of annual 'Horizon Reports'). High science and high tech, in short, become weavers of myth as much as any Ovid or Homer.

This brings this chapter back to Christoph Wulf's 'vision of total educability and formation' as the modern 'dream of education'. We can now say with Wulf that this dream, this vision or mythology, constitutes a reality that still 'swirls about the realities of life and education. This dream', as Wulf continues, 'supplements reality, corrects it, satisfies its unfulfilled desires' (2002: 278). Going further, he describes this dream as 'penetrat[ing] reality, evad[ing] it, transcend[ing] it; it designs [both] contrafactual modifications and alternatives' (ibid.: 278). Both Wulf and before him, Adorno and Horkheimer, were pointing to a dark secret behind any Enlightenment project—whether it be one of 'total educability' or of 'personalized learning at scale'. As in the case of the latest iPhone or the dream of a fully 'artificial' intelligence, such visions can never be realized in their final or ultimate totality. There is always a better product eventually to be released, or a different human capability to be imitated. In actuality, the total realization of any utopian technological (or other) vision

would only mean radiant and triumphant calamity. Indeed, for education or any other aspect of social activity to fall so completely under the dominance of a total vision of social and technical engineering would be 'totalitarian' in and of itself—at least as Adorno and Horkheimer see it. But this can be said in some ways to only make the utopian beauty of such educational visions all the more fascinating and seductive. Nonetheless, as Wulf emphasizes, there remains a 'permanent gap between [such] dreams and their realization'. And this is precisely 'what saves both the dream and the reality [it] distort[s]'. 'Were this gap to collapse, were dreams and their realizations to coincide', Wulf warns, 'they would implode, and cause perhaps the end of education altogether' (2002: 275).

Notes

[1] Other researchers speak of 'the learning analytics imperative and the policy challenge[s]' it presents (MacFayden et al. 2014). While these grand statements come from a few years ago, they can be seen as introducing and framing ambitious research work that has been proliferating since 2014; e.g. Bakhshinategh, Zaiane & Elatia 2018; Liebowitz 2018.

[2] According to Cotton Mather: see Comenius, Bardeen & Hoole 1887: ii.

[3] 'Gamification' refers to the 'use of game design elements in non-game contexts' (Deterding et al. 2011: 2), for example, turning a lesson on a historical event into a kind of 'detective' activity to find clues about what happened.

[4] See e.g. Van Lehn's (2011) meta-analysis which showed the improvement produced by tutoring to be less than one sigma. See also Barnum (2018), 'Why "personalized learning" advocates like Mark Zuckerberg keep citing a 1984 study—and why it might not say much about schools today.'

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CHAPTER 9

Technological Unemployment and Its Educational Discontents

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Introduction

Tool-making is one of the key defining features of humanity. Our relationships to various kinds of tools define the historical progress of our species (Stone Age, Bronze Age, Industrial Revolutions), our social organization (Marx & Engels 1976) and, with the advent of the Anthropocene, our relationship to nature (Jandrić 2017). Ancient tools, such as a stone knife or hammer, are of an individual nature—it takes one person to make, use and dispose of them. However, at least since the Industrial Revolutions, tools have grown much more complex; these days, it takes thousands of people to design, produce and dispose of a 'simple' smartphone that any 3-year-old can use. The collective nature of modern technologies has strongly contributed to the organization of society including, but not limited to, the division of labour. Primitive tool-making of the past has become the *technique* of the present—the social, economic and technological way of arranging our daily affairs (see e.g. Ellul 1964; Stiegler 1998; Horkheimer & Adorno 2002). With the advent of computers, digital

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technologies have permeated human lives and this has inspired development of a more nuanced postdigital approach to relationships between human beings and technologies. 'The postdigital is hard to define; messy; unpredictable; digital and analog; technological and non-technological; biological and informational. The postdigital is both a rupture in our existing theories and their continuation' (Jandrić et al. 2018: 895). The postdigital challenge is equally about the ability 'to understand the processes of quantum computing, complexity science, and deep learning as they constitute the emerging techno-science global system and its place within a capitalist system that itself is transformed by these developments' (Peters & Besley 2019: 40) and about 'making at least a small leap from the standard academic paradigm of individual knowledge development towards new forms of collective intelligence' (Jandrić 2019: 2). It is within the postdigital paradigm that this chapter enquires into the relationships between technological unemployment and its educational discontents.

One of the key promises of technology is the world without work: a utopian vision, where people do what they please while machines do all (or most) of the daily work for us. Historically, this promise has been explored in fictional and semi-fictional domains such as science fiction and futurism. However, the increasing digitization and automatization of jobs which had up until yesterday been reserved for humans—such as driving, curing people and academic research—has turned these fictional accounts into possible future scenarios (see, for instance, Peters 2017; Peters & Jandrić 2018a; Peters, Jandrić & Means 2019). The promise of technological unemployment is not all sunshine and roses. Actually, at least since the proverbial 18th-century weaver Ned Ludd smashed his two knitting frames in a 'fit of passion' (Alsen 2000: 43), people have strongly opposed the idea of replacing their work with machines. One of the major arguments for such Luddite fear of technology was the loss of jobs; however, technologies of the past have always somehow managed to create more jobs than they destroyed.

Recent research indicates that digital technologies of today may be different. Some authors think that we have arrived at a sort of Fukuyamian (1992) 'end of history' where digital technologies have finally started to destroy more jobs than they create (Brynjolfsson & McAfee 2011; Frey & Osborne 2013; Frey & Osborne 2015). Others are more careful and claim that we have no right to that type of historical exceptionism—while they cannot explain exactly how digital technologies might create more jobs than they erase, they have faith in the old saying that history will somehow repeat itself (MacCarthy 2014; Summers 2014). Currently, we do not have enough information to take sides in this debate. This implies that we need to carefully examine three possible scenarios: (1) the future where digital technologies will create roughly an equal number of jobs as they will destroy; (2) the future where digital technologies will create more jobs than they will destroy; (3) the future where digital technologies will destroy more jobs than they will create. However, the first scenario and the second scenario have repeated many times, while the third scenario is still an open

book. In this chapter, therefore, we examine an imagined future where digital technologies will destroy more jobs than they will create.

We examine negative projections of such a future and its educational aspects in three steps. We first undertake an extensive literature review to identify the main reasons why people from various historical periods and working in various fields have perceived technological unemployment as a threat. We then move on to explore an overview of contemporary concerns based on our recent work (Peters, Jandrić, & Means 2019). Finally, we examine educational discontent of technological unemployment as an agent of change.

The Luddite Fantasy?

While historically, waves of technological advancement and demographic change have led to increased prosperity, productivity and job creation, this does not mean these transitions were free of risk or difficulty (World Economic Forum 2016).

> Since the dawn of the industrial age, a recurrent fear has been that technological change will spawn mass unemployment. Neoclassical economists predicted that this would not happen, because people would find other jobs, albeit possibly after a long period of painful adjustment. By and large, that prediction has proven to be correct. (Rogoff 2012)

Rogoff adds that, although there have been problems of inequalities and wars, 'two hundred years of breath-taking innovation since the dawn of the industrial age have produced rising living standards for ordinary people in much of the world, with no sharply rising trend for unemployment' (2012). Across much (but not all) of the world, people now live longer, work many fewer hours and lead healthier lives. All good arguments for technological progress then, but does this mean that a historical fear of machines versus human labour was wrong? When, in 1812, textile-making machines at the dawn of the Industrial Revolution were smashed in the belief that these new contraptions would put hand-weavers out of work, were such worries unfounded and is the end-of-work argument simply the Luddite fallacy?

Thompson (2015) suggests we should not drop these concerns too quickly. Some economists are now beginning to worry that the Luddites were not wrong, just premature (Krugman 2013; Skidelsky 2013; Skidelsky 2014; Thompson 2015). However, Skidelsky (2014) reminds us that David Ricardo, the most influential economist of the 19th century, was stating precisely this, in his chapter on machinery in *On the principles of political economy and taxation* (1817). Ricardo, discussing the substitution of machines for human labour, commented that the 'same cause which may increase the net revenue of the country, may at the same time render the population redundant' and therefore

> the opinion entertained by the laboring class, that the employment of machinery is frequently detrimental to their interests, is not founded on prejudice and error, but is conformable to the correct principles of political economy. (Ricardo 1817)

If this is the case, then Martin Ford, in *The rise of the robots: technology and the threat of a jobless future*, takes us forward from the Industrial Revolution to the present day by providing a simple hypothetical technology narrative that expands on the eras that have followed. Ford discusses the golden era from 1947 to 1973, as characterized by significant technological progress and strong productivity growth, where innovations were primarily mechanical, chemical and in aerospace engineering. Soaring productivity during this time period made workers more valuable—and allowed them to command higher wages (Ford 2015: 51). Then, in the 1970s, productivity fell, as the economy received a major shock from the oil crisis and entered an unprecedented period of high unemployment combined with high inflation and a lower rate of innovation, as continued technological progress became more difficult. The 1980s, however, saw increased innovation, focused now in the information technology sector. Ford suggests that this type of innovation had a different impact on workers: for those with the right skill set, computers increased their value, just as the innovations in the post-war era had done for nearly everyone (ibid.: 51). For others, though, it meant their jobs were destroyed or deskilled, making these workers less valuable, until they were able to retrain for jobs that leveraged computer technology (ibid.: 52).

The 1990s then saw IT innovation accelerate even more, with the Internet taking off widely in the second half of the decade. Ford suggests that trends that began in the 1980s continued, but the decade also saw creation of millions of new jobs, especially in the IT sector. The recession of 1990–1991 was followed by a jobless recovery as workers, many of whom had lost good mid-range jobs, struggled to find new positions. The job market gradually became more polarized and, in the years following 2000, information technology continued its acceleration. Productivity rose, as businesses became better at taking full advantage of new innovations (Ford 2015: 52). Throughout the economy, computers and machines were increasingly replacing workers, rather than making them more valuable, and wage increases fell far short of growth in productivity, with jobless recoveries becoming the norm (ibid.: 52). This simple account is intended by Ford not to downplay other factors such as globalization, the growth of the financial sector and other political changes, but to emphasize the consistent role of technology within these changes.

Avent (2016) picks up this tale in *The wealth of humans*, where he describes the present as a troubling political moment, which our failure to recognize and address the difficulties created by the digital revolution has ushered us into. Avent suggests the digital revolution is:

> Putting us into the shoes of our great-great-grandparents: those who first experienced the transmission of a human voice across an electrical wire, who watched as the time to travel from one city to a distant other shrank from weeks to hours and who found themselves displaced as smiths or farmhands by fantastic new technologies. We have all found our working lives altered by it. (ibid.:2)

An important difference can be noted here though. Where the Industrial Revolution unfolded over centuries, our current technology revolutions are happening over years. The technologies of the future are those of the 2020s and therefore significant changes to the world of work are no longer distant, but imminent. Avent argues that the digital revolution alters work in three ways: first, through automation, as new technologies replace a range of workers; second, globalization has become supercharged through powerful information technology; and, third, technology massively boosts the productivity of some highly skilled workers, enabling fewer people to achieve what would once have taken very many more humans to accomplish. Therefore, automation, globalization and the rising productivity of a few are combining to generate an abundance of labour: a wealth of humans (Avent 2016). The global economy, according to Avent, is now misfiring in worrying ways, as it tries to digest unprecedented conditions that are disrupting our world. Work, alongside family, is a crucial aspect of social infrastructure that can no longer be counted on to fulfil the range of roles we have for so long attributed to it. From ordering the day, providing purchasing power and contributing to the community, as these factors can no longer be taken as given, Avent suggests something will have to give, as we struggle to find substitutes. So, is the substitute really a world without work?

Historically, this utopian vision has once resided in the imagination of writers and directors of movies. While technology is indeed not destiny (Feenberg 2002), technological development often feels as though it is the main factor determining the direction that we move in. Science fiction offers us a route to imagine how society could function differently, in both good or bad ways, increasing our awareness of futures we might want to avoid, or indeed those we might want to progress towards. For example, in *Brave new world*, Aldous Huxley (1932) envisages a dystopian world where technology might take us in the future, with routine genetic engineering and elimination of unhappiness. His story has since been considered to be prophetic. Later, in Huxley's *Island* (1962), inhabitants have for 120 years resisted capitalism, consumerism and technology. Then there are movies that introduce technologies that just a few years later are here in reality. For example, to create the high-tech world of 2054 for sci-fi blockbuster *Minority report*, director Steven Spielberg (2002) consulted with an expert team of futurists, including computer scientists, philosophers, artists and architects, with the wish for the toys he featured to come true. The movie, released in 2002, portrayed multi-touch interfaces and retina

scanners that are now routinely in use and the film has inspired many entrepreneurs and companies to innovate (Chung 2014).

Although a common theme is a world where humans do less work and machines do more, which should be a good problem to have, the prospect of this becoming a reality in the same way as a touch screen seems often to be met with controversy or it is studiously ignored. Falkner questions why, when machines have been saving humans time for decades, we have not yet reached a leisure-oriented future (2017). Referring to implications of block chain technologies for international trade that can automate work that was manual and error-prone, bringing benefits with less human labour, Falkner believes we will soon see a real reduction in human work, as promised for decades. He reminds us that John Maynard Keynes in 1930 suggested we would be working 30 hours a week by 2030 and our problem would be *too much* free time. Yet, during the 1980s, working harder, for longer, somehow became desirable and demandable by employers (ibid.). This brings into play interesting questions. Technological advancement and the way we tend to think about work are at odds if the amount of work we do defines our value as humans. Falkner argues that overwork is often interpreted as commitment rather than inefficiency, and judgments are made about those who work less. Yet, visions of a reduced working week were once visions of a more effective workforce. Then, additionally, few governments will want to cause widespread unemployment as this is understood as linked to social and economic issues (ibid.).

With these two significant concerns to consider, we question whether science fiction has some role to play in helping to begin to alter such perceptions. Menadue and Cheer (2017) suggest that fiction can provide common ground for researchers to engage with the public across a wide range of disciplines, providing advocacy and cultural insight and also acting as an aid to learning and teaching. These are important considerations given arguments about potential political unrest following a scarcity of work and suggestions that saving work is more important than saving any particular job (Thompson 2015). Similarly, McKenzie Wark says:

> It is commonplace that science fiction is not about the future, but about alternative possible presents. Science fiction is one of the things that enables you to think through relationships between different kinds of knowledge … Science fiction is not always about science, some works actually ignore the science, but it is usually about a geopolitical reality. (Jandrić 2017: 132)

Avent (2016) argues that the hardest part in finding utopia is not the figuring out of how to produce more; we have already managed that. The hard part is redistribution and sustainability when the rich don't want to subsidize the poor. He points to problems though too if we adopt a 'makers-and-takers' conception of the world, because this neglects the social foundation on which wealth is

built. Thompson (2015: 11) points to the role played by work in people's self-esteem, suggesting the prospect of a *no-work* future seems hopeless. Yet, a future of *less work* he believes still holds a glint of hope, because the necessity of salaried jobs now prevents so many from seeking immersive activities that they enjoy. This raises further questions that we intend to explore in future research alongside the societal trends brought to our attention by George Ritzer, including McDonaldization and digital prosumer capitalism (Ritzer, Jandrić & Hayes 2018).

Building a post-work society is a pressing project that cannot be ignored. We are no longer smiling at science fiction because machines that replace us are here to drive our cars and land our planes. So can we, as Srnicek and Williams suggest, fully automate the economy, reduce the working week, implement a universal basic income and achieve a cultural shift in the understanding of work (2015: 108)? That remains to be seen, but Falkner stresses the need to work out how to support people in a post-work economy and to accurately identify which jobs machines can't do. Given that we now live in the age predicted by science fiction, will we choose to give ourselves leisure, or not (Falkner 2017)?

Educational Discontent of Technological Unemployment

At the moment of writing this chapter, we have just submitted a draft manuscript for an edited book entitled *Education and technological unemployment* (Peters, Jandrić & Means 2019). Consisting of 23 chapters, the book displays a wealth of perspectives and debates about the theme. While we peer-reviewed chapters for *Education and technological unemployment*, we identified six main areas of discontent: discontent with neoliberalization, discontent with automation, discontent with dehumanization, discontent with acceleration, discontent with content of work, and discontent with educationalization. While this list is far from analytic, it does offer a good glimpse into collective concerns of scholars working in the field. In the following sections, we briefly analyse each of these areas.

Discontent with neoliberalization

Since the 1980s, much has been written about neoliberalization of education (see Peters & Jandrić 2018b; Peters & Jandrić 2018c). In brief, these writings describe dissolving of The Public University circa 1960–1980, which 'views free higher education as a fundamental human right and a necessary institution for assuring the participation of workers in the global knowledge economy, for countering technological unemployment, and for creating informed citizens within a democracy' (Peters & Jandrić 2018c: 554), and its replacement by the Neoliberal University.

> This model shifts core commitments of the university from 'the quest for universal truth' and 'the cultural infrastructure for democracy' to 'quality assurance' as defined by the discourse of efficiency and excellence, where neoliberal managerialism becomes the dominant model of knowledge performance. Structural transformation towards the 'knowledge economy' is supposed to follow from the production of knowledge, investment in human capital and the diffusion of information and communication technologies requiring 'management'. Neoliberal knowledge management rests on principles of *homo economicus* (assumptions of individuality, rationality and self-interest) that are radically at odds with distributed knowledge systems. (Peters & Jandrić 2018c: 554)

This philosophical and structural shift has produced dire consequences for employment in the higher education sector. According to *Forbes*:

> In 1975, 30 percent of college faculty were part-time. By 2011, 51 percent of college faculty were part-time, and another 19 percent were non-tenure track, full-time employees. In other words, 70 percent were contingent faculty, a broad classification that includes all non-tenure track faculty (NTTF), whether they work full-time or part-time. (Edmonds 2015)

While this statistic covers only the United States, similar trends are identified all around the world (Peters & Jandrić 2018b: ch. 3).

The Neoliberal University causes different types of discontent. From a student perspective, excessive reliance on adjunct work lowers the quality of instruction—overworked, underpaid and often without their own offices where they could see students, many adjuncts are simply unable to meet student needs (Ginsberg 2010). From a staff perspective, adjunct work is associated with poverty, job insecurity, lack of long-term career prospects and the lack of tenure protection, which results in inability to take on difficult topics in their classes (ibid.). From a social perspective, the Neoliberal University restricts upward mobility and promotes inequality. The commodified Neoliberal University sees knowledge and education as goods that can be sold and bought, and significantly reduces the public sphere (Peters & Jandrić 2018c). The Neoliberal University is supported by digital technologies, which enable practices such as automated testing and surveillance. More importantly, however, the Neoliberal University is based on powerful, rationalist logic in policies that might appear convincing, but when scrutinized, the discourse can lean towards irrationality (Hayes 2018; Hayes 2019) Furthermore, the success of educational systems is measured and evaluated predominantly though quantitative means—and the use of this or that technology is only a symptom of a wider ideological trend of McDonaldization of higher education (Ritzer, Jandrić & Hayes 2018).

Discontent with automation

Much has been written about the perils of positivist educational science, yet this has not prevented neoliberal policymakers placing increasing trust in data—a move that has stripped the Neoliberal University of many humanistic values in the process of implementing New Public Management policies of various hues and colours (Peters & Jandrić 2018b: 38). Unsurprisingly, the rising importance of data has implications for ownership over data. In line with an overall commodification of higher education, Ben Williamson shows that data about students and staff in worldwide institutions is predominantly collected and processed in the commercial sector. This transfer of ownership has profound consequences for teaching, learning and research:

> The central argument is that as educational data science has migrated from the academic lab to the commercial sector, ownership of the means to produce educational data analyses has become concentrated in the activities of for-profit companies. As a consequence, new theories of learning are being built-in to the tools they provide, in the shape of algorithm-driven technologies of personalization, which can be sold to schools and universities. (Williamson 2017: 105)

Datafication of higher education is often justified by claims to fairness and equal opportunity (Koltay 2015). However, this cannot be further from the truth, as large datasets characteristic for higher education, such as results of student performance on standardized tests, are far from neutral. A telling example is Cormac O'Keeffe's analysis of 'the role of various psychometric practices and testing theories, in particular item response theory, and their ability to link literacy practices and calculable psychological constructs'. O'Keeffe's research 'suggests that large-scale digital assessments such as PIAAC do not merely produce data about ability—more importantly, they "perform the concept of ability into being"' (O'Keeffe 2017: 133). Data is biased, because datasets reflect values and ideologies of their collectors. Furthermore, shows Jones, 'the complex systems of data production and representation co-constitute the very systems they purport to describe' (Jones 2018: 49). Upon collection, intrinsically biased datasets are processed by various artificial intelligence (AI) tools.

According to Liza Daly, 'artificial intelligence is the umbrella term for the entire field of programming computers to solve problems. I would distinguish this from software engineering, where we program computers to perform tasks.' This simple definition describes an important paradigm change in inner workings of the computer. Traditional computers, including the most sophisticated expert systems of yesterday, consisted of long lines of code which determined their behaviour: for every input, such systems would do predetermined calculations and provide an output. In contrast, AI systems are provided with some initial rules of behaviour, and then they are 'taught' by large datasets. Then, computer

independently establishes various connections between input data and produces 'intelligent' solutions to new problems in non-predetermined ways. This is the essence of machine learning, which is broadly defined as 'the science of getting computers to act without being explicitly programmed' (Jandrić 2019)

In the process of machine learning, data bias develops towards AI bias. Resulting from non-predetermined 'thinking', the AI bias is very difficult to detect and even more difficult to remove. In a recent example, Amazon developed an AI recruitment software and 'taught' the software using its own human resources archives. However, the AI showed strong bias against women, and after many attempts at fixing the problem, researchers gave up and scrapped the AI recruiting tool completely (Dastin 2018). Data bias and AI bias are currently being addressed by practices such as algorithm auditing. However, auditing arrives into play only after an algorithm is developed, and 'an audit doesn't prove that a company has avoided all the unintended pitfalls of an algorithm. The auditor might not look at the right set of stakeholders, or pose the right set of questions' (Hempel 2018). Unsurprisingly, such (lack of) solutions provide(s) a significant amount of discontent, and even for-profit capitalist giants such as IBM claim that 'it's critical to develop and train these systems with data that is unbiased and to develop algorithms that can be easily explained' (IBM Research 2018).

Discontent with dehumanization

Since the beginning of the so-called digital revolution (an imprecise term, which we use here only for its face value), people have argued that digital technologies are inferior to their analogue counterparts. For instance, many audiophiles claim that old gramophones played on valve amplifiers provide 'warmer' and 'fuller' sound than digital CDs; as of recently, old gramophone records have returned with a vengeance (Meyer 2009). Claims to computerized dehumanization are based on similar claims to superiority of the analogue over the digital, but consequences of such superiority are now much more extensive. In *Automating inequality: how high-tech tools profile, police, and punish the poor*, Virginia Eubanks (2018) outlines the history of automation within social services. She shows that (provision of) social services has always dehumanized the poor, yet automation of these services has brought such dehumanization to unprecedented levels. Eubanks shares sad stories of people who have been denied adequate health care based on decisions of computers, and of new administrative systems in which people are unable to revert automated decisions—more often than not, there is not even a human being who could listen to the complaints. Eubanks thus develops the notion of 'the digital poorhouse', which uses technological tools to control the lives of poor people to an unprecedented extent:

> Addressing the digital poorhouse can help progressive social movements shift attention from 'the police' to the processes of policing.

> Policing is broader than law enforcement: it includes all the processes by which we maintain order, regulate lives, and press people into boxes so they will fit our unjust society. The county poorhouse was an extra-judicial institution, built to imprison those who were not guilty of any crime. Scientific charity policed the lives of poor and working-class people for two generations, with brutal results. Today, the digital poorhouse uses its high-tech tools to infer and predict: to police events that haven't even happened yet. (Eubanks 2018: 179)

Similar concerns can be found in literature covering the Chinese Social Credit System where, according to *Wired*, 'Big data meets Big Brother as China moves to rate its citizens' (Botsman 2017). And similar accounts of technological dehumanization all over the world fill headlines of today's media. According to Gabriella Coleman, dehumanization is not built into technologies; instead, it results from interaction between technology and social organization (Coleman & Jandrić 2019). Focusing on technological agency, discontent with dehumanization is especially prominent in the fields of sociomaterialism, networked learning and similar (Jandrić 2017: ch. 9).

Another prominent form of discontent with technological dehumanization is linked to the impact 'of increasing digital connectedness and how this connectivity might affect the culture of learning now, and in the future' (Falconer 2019: 244). Reviewing Maggi Savin-Baden's book *Rethinking learning in an age of digital fluency: is being digitally tethered a new learning nexus?* (2015), Falconer shows 'that tethering is, if not actually a pejorative term, at least a term that implies confinement and restriction rather than freedom' (Falconer 2019: 246). These concerns are often linked to privacy, and the idea that digitally tethered people can never leave their past behind. Furthermore, automation of occupations which involve direct contact with people, such as health care and care of the elderly, also often appear in dehumanization debates, and provoke a mixed bag of responses (Frude 2019).

Discontent with acceleration

At least since Filippo Tommaso Marinetti and his 'Manifesto of futurism' (1919), speed and its connection to machinery has been praised and cursed in almost equal measure. From Deleuze and Guattari (1988) to a hectic mix of right-wing accelerationists such as Nick Land (2014) and left-wing accelerationists such as Alex Williams and Nick Srnicek (2013), technologically inducted social acceleration is clearly linked to a mix of capitalism and technology. Applying accelerationist ideas to education and technological unemployment, Sam Sellar writes:

> While accelerationism has been interpreted as wanting the worst, or as the worst kind of nihilism, its unconditional variants both prompt

> reconsideration of educational purposes and practices and suggests a minimal yet consequential shift in educational thought. Rather than asking what should be done educationally, in order to save society from the risks of technological unemployment, accelerationism prompts us to ask: How far can we go in letting go of the desire for education to solve such problems? (Sellar 2019: 142)

In this way, Sellar's critique brings the debate towards educationalization, which we explore a little later in this chapter.

Acceleration is a prominent theme in studies of (academic) time. As Crary has observed of human sleep: 'nothing of value can be extracted from it!' (2013: 11). Well, sleep perhaps bears no economic value in its own right, claims Lydia Rose, but the health consequences of lack of sleep are real. Combining academic insights into the figure of the cyborg (e.g. Haraway 1991) with fictional insights embodied in the Borg (the fictional character from *Star trek: first contact* (1996)) and in *Doctor Who* (BBC 2006), Rose shows that the 'resistance is futile' attitude might be counterbalanced by the theory of cognitive dissonance (2015: 324). Here, Rose's analysis of acceleration arrives at very similar conclusions to those in Maggi Savin-Baden's study of digital tethering (2015). However, not everyone agrees with Savin-Baden (2015) and Rose (2015), and opinion is divided on the merits of slowness versus acceleration in higher education.

Consequently, acceleration of academic time causes opposed types of discontent. Some authors claim that slowness needs to return to academia, for individual reasons (decreased stress, personal well-being, etc.), social reasons (sleep as a basic human right) and improving the quality of academic work (only well-rested people can be truly creative) (Gill 2009; Hartman & Darab 2012; Kahneman 2013). However, authors such as Filip Vostal (2013) claim that the academia also needs its 'accelerative moments' which are often connected to 'ninja-like productivity'. Yet, continues Vostal, perhaps neither of those is the real solution: 'Rather than choosing between the regressive ethic of slow scholarship on the one hand, or the time management productivity trainings on the other, academics may benefit from a more level-headed approach that emphasises autonomy over their use of time' (ibid.). Following Vostal's conclusion, both types of discontent with acceleration of (academic) time need to be understood in the context of, and in dialectical relations to, types of responses that people are able to offer in return.

Discontent with content of work

Immediately after it was published online, David Graeber's essay 'On the phenomenon of bullshit jobs: a work rant' (2013) went viral. In his essay, Graeber argued that more than half of jobs in diverse sectors from finance to public relations are useless, and if people suddenly stopped doing them, the world

would remain the same. After a few years of research, Graeber published the book *Bullshit jobs: a theory* (2018), which elaborates this thesis in detail. 'Provisional Definition: a bullshit job is a form of employment that is so completely pointless, unnecessary, or pernicious that even the employee cannot justify its existence' (Graeber 2018). Graeber classifies bullshit jobs in five main categories. (1) 'Flunky jobs are those that exist only or primarily to make someone else look or feel important' (e.g. liftboys and receptionists). (2) Goons are 'people whose jobs have an aggressive element', such as the military and corporate lawyers. (3) Duct tapers jobs exist 'because of a glitch or fault in the organization'; they solve problems which ought not to exist. (4) Box tickers 'exist only or primarily to allow an organization to be able to claim it is doing something that, in fact, it is not doing'. (5) Finally, taskmasters arrive in two categories: unnecessary superiors who manage things that need not be managed and superiors whose job is to produce unnecessary work for others (Graeber 2018).

Graeber's theory completely depends on people's personal insights; the only criterion for a bullshit job is that people feel that their job is useless. While this approach can be (and is) critiqued on many different grounds (see, for instance, Duncan 2018), bullshit jobs are increasingly present in higher education. In the publish or perish culture, academic careers strongly depend on publication. Therefore, it is very tempting to produce meaningless articles which only serve to increase one's number of publications; to divide articles into sequences; and to exchange references with authors of other equally useless articles to increase everyone's impact factors (Jandrić 2015). Also, the increasing importance of external funding implies that academics often tailor their research to meet funding criteria, usually in the direction of abandoning blue-skies research (Braben 2002). These practices, and social forces leading to these practices, cause a significant amount of discontent in the educational community (Jandrić 2017).

Another important class of bullshit jobs within the academia is within administrative positions. Numbers are stunning. In *The fall of the faculty: the rise of the all-administrative university and why it matters*, Benjamin Ginsberg shows that in US universities in the period 1975 to 2005, the number of full-time professors went up 51 per cent. In the same period, the number of administrators went up 85 per cent, and the number of other administrative staffers went up a staggering 240 per cent (Ginsberg 2010: 25). As a result, shows Ginsberg,

> … universities are filled with armies of functionaries—the vice presidents, associate vice presidents, assistant vice presidents, provosts, associate provosts, vice provosts, assistant provosts, deans, deanlets, deanlings, each commanding staffers and assistants—who, more and more, direct the operations of every school. Backed by their administrative legions, university presidents and other senior administrators have been able, at most schools, to dispense with faculty involvement in campus management and, thereby to reduce the faculty's influence in university affairs. (ibid.: 2)

Somehow, such bureaucratization of the higher education does not imply that professors and other academic staff are now free to dedicate themselves to their main tasks, teaching and research. On the contrary: during the past years, academic staff all over the world spend increasing amounts of time doing administrative tasks such as attending numerous meetings and writing plans and reports, and media outlets such as *The Guardian* are packed with their accounts of discontent (Tahir 2010).

Discontent with educationalization

Aoun, in *Robot-proof: higher education in the age of artificial intelligence* (2017), argues that a robot-proof model of HE needs to fundamentally refit the mental engines of students' minds and calibrate them with a creative mindset and elasticity to invent, discover or otherwise produce something society deems valuable (ibid.: xviii). And Aoun is hardly the only one seeking solutions to social problems such as employment in (higher) education. Already in 1995, David Tyack and Larry Cuban have written about the phenomenon of educationalization (1995). In a more recent piece, Cuban explains this tendency as follows:

> What 'educationalising' means is transferring societal structural problems to the institution of schooling so individual students and teachers then become first, an easy target to blame, and second, responsible for solving the problem. For example, national health problems of smoking tobacco and drinking alcohol in the prior century got translated into school courses for youth about the physical and cognitive damages done by both drugs. Too many road accidents? Driver training and completing a safe driver's course for high school graduation became a school-based solution to a national problem. And as you pointed out in your question, the harnessing of schools to an increasingly high-tech economy means that children and youth are engaged early and persistently in using electronic devices so that they can easily fit into a high-tech workplace. (Cuban in Jandrić 2017: 13)

Currently, students are discussed in educational policies as if they were any other type of consumer, simply purchasing a product bearing instructions for the workplace, rather than benefiting also from the transformative potential university education offers for the whole of life (Hayes 2015). Furthermore, references to 'the student experience', 'the 'body' of the curriculum or 'the student body' as if these were fixed, unchanging entities is misleading (Hayes 2017). Repeated attempts to 'fix' a range of societal issues (such as student engagement, employability, sustainability, digital capabilities) by 'educationalizing' these into university strategies lacks careful consideration of changes, both in demographics across student populations, and in relation to predictions of

impending technological unemployment in a digital age. In our recent paper, we explored educationalization of technological employment in depth and concluded:

> The idea that education can resolve the problem of technological unemployment is a political construction which has by and large failed to deliver its promise. Instead of animistic attribution of agency to abstract concepts such as 'use of technology', 'strategy', 'framework' or even education at large, we should therefore give more agency to actual researchers, teachers, and students. Policy documents implicitly and explicitly draw from taken for granted visions of neoliberal social development and the associated understandings of concepts such as education, technology, and employment. In order to counter taken for granted visions, we need to reinvent these concepts, and the associated policy language, to include opportunity for radically different, non-supercessionist futures. Finally, we need to create new visions, and imagine different social orders, where concepts such as education, technology, employment may acquire radically different meanings. (Peters, Jandrić & Hayes 2018)

Educationalization has many implications and purposes. According to Cole, educationalization 'entails the transformed economic relations of corporate capitalism'; 'calls into question the proper role of the state'; 'entails a future-oriented perspective towards time'; 'means a cultural revolution'; 'means a deep respect for science'; and 'entails an implicit (and at times explicit) utopianism' (Cole 2019). Widespread discontent with educationalization is hardly surprising, as many of these are implications and purposes are causes of discontent in themselves. In the education community, perhaps the biggest source of discontent is frustration—educationalizing social problems asks teachers to resolve problems which simply cannot be resolved within educational systems (Cuban in Jandrić 2017: 13).

Discontent as an Agent of Change

At the surface, sources of educational discontent with technological unemployment identified in our work seem to have surprisingly little to do either with technology or with employment. Discontent with neoliberalization is about the trend of diminishing rights of academic workers and its consequences. Sadly, in our educational systems, an obsession with treating students as competitive individuals and as a simple set of 'attributes' to bring to the global workforce (Peters, Jandrić & Hayes 2018) has dominated recent policy. This is worthy of our collective rage at injustices in the contemporary social and political world order (McLaren 2006; McLaren 2015), but deciding who or what our rage is directed against may require a new global stream of consciousness.

Discontent with automation, discontent with dehumanization, and discontent with acceleration are predominantly concerned with ways in which we use technologies, rather than technologies per se. Discontent with content of work, and more broadly discontent with educationalization of social problems, are pretty much non-technological questions. Furthermore, our distillation of some common sources of discontent from the edited book *Education and technological unemployment* (Peters, Jandrić & Means 2019) inevitably results in imprecise and overlapping categories. For instance, a good part of discontent with acceleration is also discontent with dehumanization and educationalization, discontent with neoliberalization is present to various extents in all other categories, etc. These categories are only analytic tools which help us to get a better grasp of the problem: acting in synergy, their dialectical relationships produce the overall feeling of educational discontent with technological unemployment. Here, we see one more surfacing of Heidegger's idea that 'the essence of technology is by no means anything technological' (1981). Unlike our policymakers would want us to believe (Hayes 2015; Hayes 2017), technologies, education and work are parts of a wider techno-social system which cannot be understood by partial analyses.

Technological unemployment and its relationships to various human activities are not cast in stone—the human race had the power to develop a certain set of conditions that have created our present, and the human race has the power to develop a different set of conditions to create our collective future (see Feenberg 2002). Studies of technological unemployment need to embrace this dialectic between being and becoming (Dall'Alba & Barnacle 2007); between where we are today and where we want to be in the future (Freire 1972). Arguably, education is one of the most powerful forces for creating conditions for the future of humankind. Therefore, our study advocates a significant change from mainstream, largely instrumental views towards education, with a view towards new directions, including those where we 'begin to teach people to do what machines cannot' (Aoun 2017: 19). While educational systems do prepare students for the marketplace, they also contribute to the creation of a (new kind of) marketplace. It is within this dialectic that we need to understand and explore the relationships between education and technological unemployment.

Discontent is a powerful force, which simultaneously makes people suffer unfavourable conditions and offers an incentive for change. In order to change a social phenomenon, however, one needs to identify what it is exactly that needs to be changed. And, in the post-digital mashup of the analogue and the digital, the physical and the biological, the technological and the political, it is often hard to see exact relationships between causes and consequences. The postdigital is indeed a rupture in our understanding of the world and its continuation (Jandrić et al. 2018: 895). Furthermore, claims Cox, 'the ruptures produced [by the postdigital] are neither absolute nor synchronous, but instead operate as asynchronous processes, occurring at different speeds and over different periods and are culturally diverse in each affected context'

(2014). Conceived within postdigital circumstances, postdigital discontent is also asynchronous and culturally diverse—as such, it has the power to develop different answers and solutions. In order to change things, one needs to simultaneously think and act, and these two activities must continuously interact and enrich each other in the act of praxis.

According to our research, the notion of educational discontent with technological unemployment and its sources is far too nebulous to be addressed directly. This is why employment strategies produce meagre results at their best (Peters, Jandrić & Hayes 2018; Hooley 2019), and this is where our breakdown of educational discontent with technological unemployment might be of use for rethinking and developing new forms of resistance. In the struggle against neoliberal (higher education) policies, we need to seriously take into account their relationships to technological unemployment; while we grapple with educational unemployment, we do need to understand its many faces, including but far from limited to, the human cost spelled out in dehumanization debates. Our study of educational discontent with technological unemployment is far too broad to develop into a well-defined critical rage pedagogy (McLaren 2006; McLaren 2015), especially in the style of its famous pre-digital proponents such as Malcolm X or its digital proponents such as Aaron Schwartz. Yet, it might provide some theoretical framing and some practical directions for picking the right target for our critical rage in the postdigital times to come.

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CHAPTER 10

Pedagogic Fixation

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Introduction

The following chapter was originally published in the book *Disruptive fixation: school reform and the pitfalls of techno-idealism* (© Princeton University Press, 2017).

At the book's core is an in-depth ethnographic case study of an ambitious New York City reform project that aimed to reinvent the American public school for the digital age. One of the main arguments of the book is that idealistic educational reform initiatives based in technologically centred formulations tend to move through cycles of 'disruptive fixation' that consolidate, rather than dismantle, inherited patterns and inequities. The cyclical process tends to begin when powerful people who are not typically educational experts—policymakers, philanthropists, pundits, journalists and so forth—call for and sometimes offer to support technologically cutting-edge education reform. In doing so, these powerful outsiders typically diagnose existing educational systems as broken and outmoded as they reaffirm more widely held social, political and moral yearnings about the role of education in a liberal-democratic society.

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In the next stage of the cycle, technological and educational experts respond to these calls for 'disruption' by designing and proposing what they see as path-breaking educational reforms. These experts do so in large part because they need to secure support from these more powerful outsiders in order to sustain and build their careers and in order to enact their expertise. To design cutting-edge educational reforms, experts engage in two interrelated processes that the anthropologist Tania Murray Li (2007) has called problematization and rendering technical. Problematization refers to the particular ways in which experts render the people and worlds into which they plan to intervene as broken and, thus, in need of fixing or improvement. Rendering technical refers to how experts figure those persons and worlds as intelligible with, amenable to and governable with the new tools and techniques that the experts have on hand or are in the process of developing.

Together, the process of problematization and rendering technical allow experts to convince themselves and many potential supporters that their planned intervention is potentially transformative in beneficent, unprecedented and significant ways. However, processes of problematization and rendering technical also have the effect of occluding much of what cannot be measured and manipulated with the tools that experts have on hand, including, importantly, political-economic structures and entrenched relations of power. As such, when a 'disruptive' philanthropic intervention in launched, it quickly faces many destabilizing factors and forces that were excluded during processes of problematization and rendering technical. In response to these unanticipated forces, the people charged with executing a reform initiative quickly search for stabilizing resources, many of which come from canonical versions of the institutions that reformers hope to disrupt and some of which come from elites in the worlds targeted for intervention. While these stabilizing resources allow reformers to avoid an embarrassing collapse of their intervention, they also tend to have the effect of remaking many of the institutional patterns and inequities that reformers had problematized and hoped to dismantle.

The following chapter, Pedagogic Fixations, examines this cyclical process as it pertained to the school reformers' attempts to develop a 'game-like' pedagogy that was designed for the presumed needs of a 21st-century workforce and citizenry. In addition to illustrating how a disruptive philanthropic intervention often reproduces many of the problems that reformers aim to remedy, the chapter also begins to investigate how many people who commit themselves to such initiatives often manage to maintain optimism for their experiment. A key component in this ideological work is what I refer to as sanctioned counter-practices: moments when an intervention more or less resembles its idealized formulations. As the chapter shows, sanctioned counter-practices play a relatively minor role in the day-to-day routines of an intervention, yet they play an outsized role in how reformers represent a project to themselves and to influential outsiders, such as journalists, parents, city officials and officers from funding agencies. The chapter argues that these ritualized celebrations of sanctioned counter-practices are not so much attempts to manipulate outsiders' opinions

as they are occasions when both insiders and outsiders can collectively affirm their commitment to a novel moral enterprise.

. . .

About a week after the Downtown School opened, I was sitting with students in a class that focused on science. The class began much like a traditional middle-school science class. The teacher, Cameron, controlled a PowerPoint presentation from the front of the room, and the students and I sat quietly on stools around elevated tables with slate tops and sinks in the middle. Cameron explained, 'We are going to go over some classroom procedures that are boring and not fun.' The procedures included step-by-step scripts for how we were supposed to enter and exit the classroom. He also explained that each table was a group and that each member of the group would have a job. In response, a few students asked questions such as, 'Will we get a paycheck?' and 'Can we get fired?' Cameron did not answer these questions, but instead clapped his hands in a pattern that the students had learned to repeat back. The room quieted and Cameron continued listing the jobs. The first two jobs were Paper Collectors, to which one of the students at my table whispered to the rest of us, 'One, two, three, not it.' The next job was called Material Master and the final job was called Clock Watcher. The students at my table debated who would be the Material Master—nobody wanted to be the Clock Watcher or the Paper Collectors—and eventually a coin toss by Cameron settled the issue. After jobs were assigned, Cameron showed a slide with a picture of Isaac Newton and asked students if they knew the person in the image. At this point, I noticed one of the school's designers, the principal, and another adult—who I later learned was a reporter—quietly enter the back of the room. Cameron told us that while we all knew about YouTube, we probably did not know that there was also a website called TeacherTube. Cameron then started a video clip entitled 'Newton's First Law', which opened with a shot of dominoes knocking each other over in a chain reaction. At first, the video looked like a typical instructional video, except that glitches occasionally disrupted the image and the sound seemed muddled and distorted. Suddenly, odd-looking sock-puppet characters—which I later learned had been appropriated from the popular video game Little Big Planet 2—bounced across the screen while making unintelligible squeals. The students looked as perplexed as I was. Cameron stopped the video, said, 'That's weird', and then fussed with his computer. As he did so, he casually shared that perhaps an e-mail he had received that morning could help us figure out what was going on. Cameron projected the email onto the Smart Board at the front of the classroom, and we read that there was a hidden package in the back of the classroom.

Everyone was looking at Cameron, their backs erect, and a few even stood on their feet. One student called out, 'Why are you doing this?' Cameron did not answer the student, but instead told the class that he was going to form a search party to look for the hidden package. He asked for volunteers, and nearly all the students' hands went up. The four students that Cameron chose for the

search party quickly scrambled to the back of the room and scoured the tables, chairs and cubbies. Soon, one of these students found a large manila envelope that had been taped under a table. Cameron asked the student to bring him the envelope, from which he retrieved a letter that was adorned with pictures of the sock-puppet characters that we had seen in the video. According to the letter, these characters needed our help because their houses kept falling down. According to Cameron, the students would spend the rest of the trimester trying to help the sock-puppet characters learn how to build better houses. To do so, we would have to learn about physics.

At the back of the room, the designer, principal and reporter smiled and whispered among themselves before leaving. Cameron quieted the class and then asked several students to pass out a worksheet that had also been included in the package from the sock-puppet characters. The worksheet asked us to make identification badges, and Cameron told us that if we did not finish our badges during class time, then we could finish them at home. The next time the class met, Cameron passed out a second worksheet, also purportedly from the sock puppets. This one asked the students to look at a technical diagram and answer questions such as, 'What information can be gathered from the picture?' Cameron told us we had eight minutes to do the worksheet and that if we did not finish, it would be homework. He projected a countdown timer onto the Smart Board and we got to work.

. . .

Tracing the processes by which yearnings for philanthropic disruption are translated into interventions that paradoxically tend to help remake and extend existing institutional arrangements and power relations, examined how reformers' spatial fixations largely exclude the ways in which the production of space is always part of more extensive political processes that reformers cannot control. These oversights were made visible once the production and connection of learning environments was viewed not only from the perspective of reformers and designers, but also from the perspective of parents and caregivers. This chapter examines how similar tunnel vision is entailed in reformers' pedagogic fixations. Like spatial fixations, pedagogic fixations occur through processes of problematization and rendering technical, but pedagogic fixations focus on changing persons rather than on spaces per se. Pedagogic fixations help reformers act, think and feel *as if* the activities they are imagining and designing for others are both novel and in the best interest of their recipients. Philanthropic interventions that aim to transform and improve a target population often entail these pedagogic fixations, and yet, as we will see, these fixations are also remarkably fragile and hence have to be repeatedly repaired in practice in order to survive.

While pedagogic fixations help reformers and their backers act as if they are participating in a project that is innovative and beneficial for the target population, factors and forces excluded by these fixations create countless unanticipated problems for reformers as soon as their intervention is launched. Once

an intervention is set down in the world, these unanticipated forces overflow the project and destabilize reformers' carefully designed activities, so much so that reformers can even worry that their project will collapse. In theory, these moments of instability are opportunities when reformers can re-examine their pedagogic fixations, and to some extent they do. But the dominant tendency is not so much to question the fixations that arose during processes of problematization and rendering technical as to engage in a different sort of fixation: reformers quickly reach for stabilizing resources wherever they can. Ironically, many of the resources that are ready-to-hand come from canonical practices in the figured worlds that reformers aim to disrupt (DiMaggio & Powell 1983). As such, attempts to disrupt the status quo in open and improvizational ways can have the paradoxical consequence of re-fixing activity into rather enduring and tightly scripted forms.

Curiously, many of the people who committed themselves to the Downtown School mostly maintained their pedagogic fixations throughout these processes, particularly their sense that the school's pedagogic activities were both unconventional and philanthropic. From a social practice theory perspective (Holland & Lave 2001), the endurance of these pedagogic fixations cannot be reduced to dogmatism or simplistic notions of ideology. Rather, we must look for how these fixations are maintained and repaired in practice, in part through what the ethnographer Amanda Lashaw (2008) has characterized as 'the ample production of hope'. Ironically, it is partly through this ongoing revitalization of optimism that reformers often end up helping to remake and extend that which they hope to disrupt.

Designing Beneficial Experiences

As discussed previously, the Downtown School's most distinctive innovation was to try to redesign the pedagogic activities of schooling as if they were an engaging and beneficent game. Like the reformers' spatial fixations, this pedagogic fixation partially arose through processes that problematized not only conventional schooling, but also modernist state institutions more generally. Like many other social reformers who have been inspired by the seemingly dynamic organizations and work cultures of Silicon Valley, the designers and backers of the Downtown School problematized reformers of the past for creating organizations that were hierarchical, rigidly scripted and, hence, controlling. These previous attempts at social and organizational engineering were seen as inhibiting, rather than enhancing, the capacities of the people who worked in bureaucratic organizations, as well as the people those organizations claimed to serve. By contrast, games appeared to offer an inspiring alternative model for how experts and managers could design and organize experiences for others. Game design, and experience design more generally, appeared to offer a way for experts and managers to craft activities that were organized and goal-driven, but also flexible, improvizational, creative and even fun. Most importantly, doing so would allow

experts to redesign activities that benefited people in ways that more Tayloristic approaches to organizing activity did not. Games and experience design, proponents argued, would help unleash people's inherent creative capacities and would thus amplify innovation, learning and personal satisfaction.

Of particular interest to the reformers who designed the Downtown School was the work of the sociolinguist James Paul Gee, who had written an influential book on the educational potential of video games (2003). Gee had also received large grants from one of the philanthropic foundations that was sponsoring the Downtown School, and he served as an advisor on the project. By turning pedagogic activities into a game, the school's designers hoped to overcome conventional schooling's emphasis on tightly scripted and obedient behavior, as well as its related reliance on surveillance and coercive disciplinary techniques, which, as we know from Foucault (1977), are not features unique to schools. According to Gee and the school's founders, well-designed games would allow students to actively and creatively explore a 'problem space' that became incrementally more difficult as the players progressed and their skills developed. Moreover, these games would provide students with a context for their activity and, thus, with resources for constructing personal meanings and emotional investments in their school-based activities. By taking on the identity of the game's characters, students would not only be motivated to participate in schooling, but they would also produce beneficial personal transformations, conceptualized as learning, as they did so.

The vignette at the opening of this chapter begins to illustrate how the Downtown School's designers tried to implement this hopeful vision of pedagogic activity. Near the beginning of a trimester, the teacher in each course would introduce a 'mission' for that course. These episodes, which typically lasted for 20 to 30 minutes, were meant to introduce students to the designed game world that would frame the students' schoolwork in that course for the trimester. The designed game worlds would consist of characters that did not belong to the school and who needed the students' help. For example, the sock puppets described in the vignette at the opening of this chapter needed the students' help so that their houses would stop falling down. In another class, a set of fictional characters needed the students' help decoding messages in order to solve a mystery about a missing character. In still another class, professional editors at the transnational media conglomerate Pearson supposedly needed students' help designing educational comics and so on. Guided by teachers, students would interact with these non-school characters through Skype phone calls, video chats, recorded videos, blogs, e-mails, physical letters and other telecommunications. In practice, these episodes were a noticeable break from conventional classroom activities and, as evinced in the opening vignette, many students did appear to be alert and engaged when they occurred, much as the reformers had hoped.

But when considered in terms of the school's everyday routines, a very different picture of the school's pedagogic practices begins to emerge. Most

noticeably, these unconventional and less-scripted moments were rather fleeting and negligible compared to the abundance of conventional, highly scripted schooling activities. After brief episodes in which students communicated with characters from the designed game worlds, daily life would quickly return to familiar school routines in which managers, here teachers, issued subordinates a near constant succession of fine-grained commands. In the vignette just described, the sock puppets assigned the students paper worksheets that could be completed as homework if they did not finish them in class. In the school's math class, which had been framed as a code-breaking academy, one of the students' first challenges was to take a paper and pencil test on fractions. In class after class, a common pattern emerged: after an unconventional and improvizational exchange with characters from the designed game worlds, educators returned to conventional schooling practices with familiar power relations and adult-scripted activities, but these schooling practices had been relabeled as if they were part of the game.

Consider, for example, how the school's designers attempted to transform the familiar disciplinary practices of hierarchical observation, normalizing judgments and examinations (Foucault 1977). According to the school's designers, their goal was to help all students become masters in the school's various knowledge domains. Much like a video game, students would get feedback rather than grades, and progress would be measured in terms of moving through various stages and levels in the game. Moreover, this feedback would supposedly come from within the designed game worlds. Instead of teachers assessing students, characters in the designed game worlds would supposedly evaluate students' work. The above-mentioned paper-and-pencil test for the code-breaking academy is an example of this sort of symbolic transformation of a familiar disciplinary technique. The teacher presented the test as if it were an entrance exam to the code-breaking academy, but it was also a formative assessment for the school's educators. Moreover, the feedback students received on their various assignments did not use letter grades or points out of 100, as is done in conventional schools, but it was still organized on a linear scale with five ranked categories—master, senior, apprentice, novice and pre-novice—each of which also had the equivalent of pluses and minuses—Level 1, Level 2 and Level 3. The labels had changed, but the underlying practices had not. The school's designers envisioned a similar transformation in how they organized the curriculum. All students were required to take the same five courses, and they had little say over what they were expected to learn in each course. While the reformers referred to these courses as *domains* and assigned imaginative new labels to each one, the content of these courses was defined mostly by state standards and to a lesser degree the school's designers and educators. One course covered New York State's standards for sixth-grade science education, another class focused on the state standards for math education, another combined social studies and English and language arts, and another course blended physical fitness with what educators referred to as 'socioemotional learning'. The school's most

unconventional course focused entirely on media production, which in the school's first year consisted of game design. The reformers also tried to incorporate what they referred to as '21st-century literacies' within these domains, which in the school's first year consisted of teamwork, systems thinking and time management. Each domain was supposed to focus on these literacies, as well as the state-mandated content. In any case, students had no voice in shaping the curriculum, despite reformers' claims to be student-centred.

Spatial and temporal routines also mostly resembled conventional schooling practices; if anything, they were even more tightly scripted by adults than I recalled from my own experiences in public middle school. Students were expected to be within the physical boundaries of the school from 08:30 in the morning until 15:30 in the afternoon. During this time, adults required students to participate in a nearly continuous succession of tasks that educators defined and oversaw. A standardized schedule coordinated the movement of classes between rooms and the transfer of authority between adults at nine points during the day. Thirty minutes at the beginning of each day was scheduled for a school-wide assembly, called Morning Meeting, and a follow-on 10- to 15-minute advisory period. There were then four 50-minute academic periods, followed by 45 minutes that was split between lunch and recess, followed by two more 50-minute academic periods, before ending the day with a 15-minute advisory session. Throughout the week, individual classes would oscillate between 50 and 100 minutes, taking up one or two scheduled periods. Within each of these time blocks, teachers directed students to work on scripted tasks that typically lasted 20 minutes or less, and many of these scripted activities were broken down into successive step-by-step procedures that resembled algorithms.

Typical pedagogic activities consisted of small projects, mini lessons and short assignments. Projects were the least adult-scripted activities and yet adults had a heavy hand in managing these activities as well. Students usually worked on a project in increments of 30 minutes or less over several class periods. Educators defined project goals and often the roles of teammates. In many cases, teachers also assigned students to different roles, provided directives on how to reach those goals and assessed the quality of students' work. Mini lessons, which were a daily routine in most classes, followed the familiar lecture format. Teachers provided information and modeled phenomena as students took notes and sometimes asked questions. Mini lessons were typically shorter than projects. Many were approximately 10 minutes in length, and in longer periods teachers would sometimes do more than one mini lesson per class. Assignments tended to be highly scripted information-seeking tasks or problem-set exercises. For information-seeking assignments, teachers typically provided students with a book, a photocopied packet (usually copied from a textbook) or a specific website. Students would then answer questions by extracting information from the designated source and transferring it, often with minimal interpretation or translation, to a preformatted answer document. Sometimes students would answer these questions on paper handouts and sometimes they would use the

school's laptops to answer questions in a Google Doc that was accessible to the teacher. When using the Internet, the teacher would define which website and even which webpage the students should access, and students would be reprimanded for leaving the specified webpage. Problem sets mostly resembled standardized tests and were primarily used in the math-themed class. These, too, tended to be relatively brief, with most lasting 20 minutes or less.

This sketch of the quotidian pedagogic activities at the Downtown School shows a puzzling discrepancy between the reformers' vision of unprecedented creativity and fun and the striking conventionality of daily life in the school, a conventionality that educational historians David Tyack and Larry Cuban (1995) referred to as the 'grammar of schooling'. While the reformers championed student agency and creativity, students had very little say about what they could do, and most of what they were supposed to do was quite similar to the very schooling practices that reformers criticized and aimed to replace. Most of what reformers had changed was the language used to describe these conventional practices.[1]

Later, we will see how reformers managed to work with and through these seeming contradictions, but, for now, it is important to emphasize two key points that are central to this later analysis. First, forces that reformers could not control often structured the practices that they most overlooked. Just as the reformers tended to downplay their school's entanglement in competitive processes of social selection, so too they tended to overlook and underemphasize the ways in which their entanglement in educational systems structured much of the project's pedagogic activities. Newly available means, as I have been emphasizing, tended to fix reformers' energy and attention on what they could foreseeably control and transform with these new tools. Second, it is worth noting how reformers' optimistic vision of disruption obscured the ways in which those who enacted the project would exercise power over those that they figured as beneficiaries of their philanthropic intervention. If games had especially strong motivational powers and if contemporary youth voluntarily played games for hours on end, then a game-like intervention would seemingly escape the ethically thorny issue of coercing participation. Similarly, if feedback came from fictional game characters, then educators did not appear to be exercising power over students through grading practices and so on. This downplaying of the power relations inherent in pedagogic interventions was an optimistic oversight that left reformers unprepared to deal with people who resisted the reformers' philanthropic offerings, as we will now see.

Overflowing and Retrofitting

Not long after the school opened, it became evident that the school's game-like pedagogy did not have the motivational powers that the school's designers had hoped. Almost immediately after the school opened, many school leaders,

teachers and parents worried that students were out of control. Some students talked back, made fun of the designed game characters, ignored or played with directives from teachers and generally asserted themselves in ways that made it difficult for teachers to stick to the scripted activities that they, game designers and curriculum designers had jointly crafted. Students were exercising their creativity and agency, but not in the ways in which the school's designers had anticipated or desired. Instead, students were transforming the reformers' carefully designed activities towards their own interests and sensibilities. Here, for example, is a snippet from my field notes not long after the school opened:

> We're lined up in the hallway waiting for Sarah [the teacher] to take us to the gym. Before heading up the stairs Sarah reminds us of the procedures we're supposed to follow after we arrive: place our bags and jackets against the wall, run three laps around the perimeter of the gym, then get in a big circle and quietly wait for her instructions.
>
> Sarah goes on to tell us about the main activity for the day. She tells us we're going to split into two lines and play a game with basketballs. Troy shouts out, 'Knockout!' Several other students follow his lead and also shout out 'Knockout.' Sarah ignores them and starts explaining what we're going to do: a student at the front of one line will shoot the basketball, then the person from the front of the other line will rebound the ball and give it to the next person in the shooting line. Each student will then go to the end of the opposite line and the process will repeat.
>
> 'That's not Knockout,' Troy says.
>
> Sarah says that this is what we'll be 'playing' today. Troy counters that Knockout is more fun.
>
> Sarah responds by telling Troy, 'When you grow up and become a teacher then you can have everyone play Knockout.' Sarah also reminds the students that gym was part of their grade.
>
> Rake blurts out, 'Who knew so much fun stuff would be part of our grade?'
>
> Sarah tells him to, 'Knock off the attitude.'

A similar dynamic played out in every class: when students tried to question or bend reformers' and educators' scripted activities, educators corrected them and tried to compel their participation in the school's version of fun. Many educators equated student resistance with personal disrespect or with spoiling the fun of the group. For example, when one of the students called out, 'This

is so fake!' as the teacher showed students a blog message that had supposedly been written by a master game designer, the teacher snapped back, 'Stop ruining it for everyone!' Similar tensions played out in all classes, especially at the beginning of the year.

Reformers' and educators' concerns about control also extended beyond the pedagogic activities of classrooms. As just mentioned, the school's designers had allocated 45 minutes for lunch and recess, which they roughly split into two equal time blocks. At the beginning of the year students could more or less do what they liked during recess so long as they hung out in a designated classroom or the gym, both of which were monitored by adults. The students who hung out in the gym produced a heterogeneous assortment of activities that often bled into one another. Students moved around noisily and fluidly, many improvizational games emerged, and participants moved in and out of various activities, changing their own course and the course of the activities in the process. Some students shot basketballs, some played with jump ropes, others did cartwheels, some roamed the perimeter of the gym and others hung out with friends in small groups. Many students moved between activities and social groups and there was no clear overarching plan or structure, perhaps suggesting opportunities for breaking down preconceptions about class, gender and race.

However, some of the school's designers and educators worried that this arrangement was too chaotic, noisy and out of control. As one of the school's designers mentioned to me as we watched the students play during recess, '[I don't know if they [the students] can handle this. I could hear them from the street when I went to get lunch.' These moments of concern evince the dilemmas that contemporary institutional reformers face as they try to reconcile, on the one hand, their aspiration to design activities that promote creativity, agency and transformations towards self-realization among an intervention's intended beneficiaries and, on the other hand, the more instrumental mandate to control, measure and develop those persons into particular idealized subjects.

While these dilemmas could theoretically be moments in which reformers questioned their assumptions, and particularly the enduring yearning to create apolitical and philanthropic mechanisms for learning, the dominant tendency was to engage in a different sort of fixation: the school's designers and educators quickly searched for resources that would stabilize the project against the unanticipated turbulence of students' unsanctioned behaviour. In response to students' resistance to the adult-scripted activities—all of which evinced the student-centred agency that reformers championed—the school's designers, leadership and educators quickly attempted to establish the authority of school adults in order to regain control of students and hence their project. Ironically, they mostly did so by retrofitting the project with the very techniques of discipline and control that were common at the conventional schools against which they had defined their project and themselves.

In several classrooms, desks were rearranged from inward-facing clusters of five desks—an arrangement which put some students' backs towards the

teacher, but also allowed for easier peer communications during student-driven project work—into sequential rows that all faced the teacher at the front of the room. Further, educators intensified their efforts to orchestrate a seamless flow of adult-scripted activities, even during moments when students had previously enjoyed some autonomy, such as recess and the brief passing period between classes. Within a week after one of the school's designers expressed concern that students might not be able to handle recess in the gym, educators introduced adult-scripted activities for recess in the gym. Half the gym was organized into a football game administered by one of the educators. In the other half of the gym, students were allowed to organize their own smaller games, so long as they remained relatively quiet and spatially contained. Most students who did not play football stopped going to the gym after these changes, and some social divisions among students, notably gender divisions, became more spatially calcified during recess. During passing periods, which educators saw as moments when they could lose control, teachers introduced a script in which they organized students into quiet, forward-facing, single-file lines before they left a classroom. After such a line was formed—which could take some time—teachers marched students down the hallway to their next class, where they then waited quietly against a wall until the next teacher allowed them to enter. All teachers introduced this script at the same time, about a month into the school year. Further, in the middle of the fall, all the educators established a pedagogic script where they directed students to begin a silent, individual, teacher-defined task for five minutes immediately upon entering a new classroom.

In addition to extending practices of surveillance and control to spaces and periods where students had previously experienced some autonomy, educators also intensified their grip in domains where they had already been exerting their authority, albeit in the obscured ways discussed in the past section. In classrooms, educators not only continued to define and enforce scripted activities for students, but in a Tayloristic fashion instructors started breaking down these scripts into ever-smaller step-by-step procedures. In many classes, educators accompanied these fine-grained scripts with techniques intended to facilitate a heightened awareness of 'clock time' (Thompson 1967) among students. While modernist institutions have long emphasized clock time, this orchestration became more fine-grained and explicit than I expected. The reformers referred to their focus on clock time as 21st-century literacy called time management, but time management typically had a lot to do with classroom management, in which students ironically had little say over how they managed their time. Many educators saw clocks and timers as a useful way to keep students on task during scripted activities, as well as when they transitioned between these activities. What educators facilitated was a near-constant awareness among students of how much clock time they had left or had spent on a given task. When directing students to do a scripted activity, educators would almost always tell the students how much time they had for the activity.

Many would use their laptops to project a digital countdown timer for the activity onto the whiteboard at the front of the class, which functioned as a continuous animation of clock time slipping away. Many educators also wore stopwatches around their necks and routinely referred to their stopwatches as they called out how much time was left before the scripted activity ended. Educators expected students to be in their assigned seats and listening for the next directive when a timer ended.

Not only were these references to clock time much more pervasive and evident than I had anticipated, but they somewhat surprisingly had the 'gamifying' effect of adding a sense of urgency and competition to what were otherwise rather trivial and boring tasks. The approaching termination of the timer could turn an otherwise boring and scripted activity into a race against the clock, and as timers approached zero you could sense a palpable rise in the energy of the students, an emotional rush that I also felt when I participated in these rote routines.[2] Several teachers even punctuated the end of a countdown timer with the visualization and sound of a large explosion, further adding to a sense of excitement, even though the tasks that we were completing were often quite rote and meaningless. This rush against the clock was sometimes reinforced by a manufactured sense of competition among students and classes. For example, at one point during the year, an educator made a game out of how quickly students could line up quietly before entering his classroom. He taped a large piece of butcher paper on the wall outside his classroom and wrote how many seconds it took for each class to line up quietly before being admitted into the room. This went on for several weeks as classes competed against each other to see which class could be the most disciplined, until the winning class had achieved a time of less than four seconds.

> Of course, these processes for creating order and discipline were in glaring contradiction to the reformers' pedagogic fixations—which purported to cultivate student agency, creativity, improvizational problem-solving capacities and so forth—and yet, seemingly paradoxically, the designers of the school were often complicit in the introduction of these highly scripted practices. What is more, many of these techniques were either replicates, if not enhancements, of the techniques used in the more traditional schools against which the reformers had contradistinguished themselves. In keeping with DiMaggio and Powell's (1983) notion of 'mimetic isomorphism', many of these canonical management techniques were introduced either by reformers and educators who had worked at other schools or by representatives from the Downtown School's School Support Organization (SSO), the latter of which was meant to replace school boards within New York City's autonomy for accountability exchange. And the techniques were introduced in a coordinated and standardized fashion across the entire school, often right after the school's weekly professional development session.[3] Here, for

> example, is a portion of an e-mail that one of the school's leaders sent to the school's faculty and staff; in it, the leader explicitly calls on educators to tighten their scripting of students' behaviour:
>
> During [our professional development period] we discussed the importance of the directions we give students. Are directions given both orally and in writing or are they only being delivered orally? Are they broken down into small steps or are there many steps embedded in narrative? Every lesson at The Downtown School thoughtfully considers what students are being asked to do. Please remember to review how you are asking them to do it.

This purposeful import and deployment of canonical disciplinary practices raises the curious question of how reformers managed to reconcile their practices with their ideals. In the words of Bennett Berger (2004), who studied similarly wide gaps between ideals and acts in his study of a group of countercultural communards in northern California, such reconciliation requires a lot of ideological work.

Repairing Idealism

Part of the answer to the question I just posed has to do with the occluding effects of fixations. As I have been arguing, reformers tend to fix their imagination and attention on aspects of the world they can foreseeably transform in morally sanctified ways with their seemingly innovative remedies; correspondingly, they tend to overlook and take for granted whatever they cannot so easily control and transform with these newly available means. As we have seen, the school's designers did not have the power to change many of the factors that structured canonical pedagogic practices. The state and the Department of Education, rather than the school's designers, determined much of the curriculum, as well as funding for student–teacher ratios, the allocation of space and many other resource provisions. The built environments that they inhabited—consisting of multiple similar classrooms, each of which had been designed for a single educator teaching several dozen students—were inherited and built with canonical models of schooling in mind.[4] Additionally, the school had to be able to interoperate with other schools in the broader New York City schooling system, as well as with colleges and universities. Part of its mandate involved receiving and delivering students in age-graded cohorts and producing standardized outcome metrics that made students and educators legible, hence differentiable, in processes of social selection and managerial oversight that extended beyond the space of the school. Reformers and educators had to comport themselves to these more entrenched strictures, and they deliberated how to do so, but reformers, in particular, did not tend to see such practices as central to what their project was all about.

How so?

For one, despite their professed student-centred ethos, more widespread and deeply sedimented ideological edifices about age relations and developmental temporalities helped reformers and educators downplay aspects of their pedagogic practices that were particularly at odds with their ideals. As sociologists of childhood and youth have documented, modernist practices of disciplining and controlling children and young people are legitimized, and hence often taken for granted, in part because of a more general tendency among adults to infantilize children and young people, a tendency that emerged alongside broader historical changes in the social and cultural organization of age relations (Zelizer 1985; Qvortrup 1994; James, Jenks & Prout 1998; Corsaro 2005). Figuring children as particularly underdeveloped and vulnerable is especially common in figured worlds that take the care and development of children and young people as their *raison d'être*. There were too many of these infantilizing practices to enumerate, but the reformer's previous comment that the students couldn't handle recess in the gym is one such example. Additionally, some educators routinely addressed the students with labels that positioned them as immature and inexperienced because of their age—terms such as boys and girls—and one educator even reminded the students that they were being addressed with these terms because they had not yet proven themselves worthy of a more mature and autonomous status. More commonly, educators routinely subjected students to didactic lessons on topics that students were presumed not to know, but were, in fact, quite knowledgeable about. One such episode was a school-wide assembly in which educators made students perform small skits in which they acted out norms for polite social etiquette, such as how to hold the door open for someone and how to acknowledge the act with the phrase 'thank you'. Students already knew about these normative conventions, even if they sometimes did not enact them, in part, I believe, to demonstrate their autonomy from adult-imposed strictures. As we will see in the next chapter, these sorts of infantilizing practices produce conditions for oppositional behaviour, especially for subordinates who can gain status among their peers by demonstrating resistance to supervisory power.[5]

Additionally, experienced reformers and educators routinely made a distinction between practices of control and practices of care, the former of which they classified as classroom management and the latter of which they classified as pedagogical or learning activities. In practice, classroom management and pedagogic practices were one and the same, with purportedly caring pedagogic practices taking forms that helped sustain authorities' control in crowded conditions. Yet, experienced reformers and educators tended to classify management practices as a separate but necessary precondition for administering pedagogic practices, and the latter was widely seen as beneficial for all students and hence as morally caring. For experienced reformers and educators, classroom-management practices seemed to be understood as a necessary, sometimes ugly, but also fairly mundane aspect of being a professional

educator. And, if anything, experienced reformers and educators seemed to see those of us who were newer to their figured worlds—such as reformers who came from the worlds of technology design, as well as myself—as a bit naïve. As I spent more and more time in the school, I often got the sense that learning how to discipline and control students was treated by experienced educators as a sort of *sub rosa* aspect of being an experienced member of their figured world.[6] Indeed, new reformers and educators became more experienced old-timers in part by learning to make the distinction between classroom management and pedagogic practices, as well as by learning how to be comfortable exercising power over young people. Perhaps recalling their own experiences as novice teachers and knowing that I was new to middle school as an adult, several of the experienced educators would make comments to me such as, 'Teaching is crazy, right?' after I witnessed an educator deploy a variety of rather domineering disciplinary techniques in an attempt to corral and pacify students. When I agreed, I felt as if I was beginning to be let into their club, in part by treating the exercise of power over young people as a normal, and even skillful, aspect of being an experienced educator.

While less-experienced reformers seemed to share my sense that many of these disciplinary practices were odd, if not unsettling, the division of labour in the philanthropic intervention also made it easier for these reformers to downplay and overlook the extent to which their project involved exercising coercive and disciplinary techniques on those it was designed to help. At the Downtown School, there was a fairly sharp and spatialized division of labour between the people who designed and supported the intervention and those who implemented it. By and large, the school's design team spent little time managing everyday life at the school, even though they held considerable power over those who did. The founders of the school spent increasingly little time in the school as the project aged, and the practitioners who did spend their days in the school were split between, on the one hand, a group of game designers and curriculum designers who were largely responsible for crafting the school's innovative pedagogy and, on the other hand, teachers and administrators who enacted the designers' pedagogic scripts, managed students and were charged with keeping the school running. It was the school's philanthropic backers, its game and curriculum designers, and its founders who remained the most enthusiastic about the school and its innovative philanthropic potential, and yet they also had comparatively little responsibility for, as well as less exposure to, its quotidian functioning. Additionally, those of us who were newer to educational reform were able to treat canonical practices of discipline and control as respectfully belonging to the world of professional educators. For example, one of the school's founders, a media technology designer, noted to me that they also found educators' classroom-management practices curious, but then quickly distanced themselves from the remarkability of such practices by suggesting that they were an oddity of what professional educators do.

Finally, and as noted earlier, the school's isomorphic drift was partially obscured and discounted because many of these familiar features had been recoded with terminology borrowed from technology design, especially game design. This terminology downplayed the ways in which educators not only remade canonical practices, but also controlled others through those practices. All these dynamics help explain how reformers and educators were able to reconcile tensions and contradictions between the project's ideals and its acts. All have the effect of occluding, normalizing, translating and generally downplaying the ways in which the school's pedagogic activities were shot through with the very techniques that reformers aimed to disrupt. Yet, practices that occlude, distort and overlook do not adequately account for how reformers and educators also manage to maintain and repair their sense that a philanthropic intervention is both cutting-edge and morally sanctified. Oversights can help such fixations persist, but they do not provide experiences that renew a collective sense of moral optimism. The maintenance and revitalization of such feelings depend on the collective accomplishment, and ritualized valorization, of what I call sanctioned counter-practices.

Sanctioned Counter-Practices

At the end of every trimester, the Downtown School's educators thoroughly reconfigured the school's social, spatial and temporal routines. All normal classes were suspended and students were assigned a single challenge to work on with a small team of their peers for the rest of the trimester. For the first trimester, educators challenged teams to build a Rube Goldberg machine out of everyday materials that parents and educators had donated; for the second trimester, students wrote and produced short plays based on fairy tales that they had remixed; at the end of the third quarter, students produced a field day consisting of physical games that they had designed. This was Level Up, a special week-long period that was staged at the end of each trimester.

Level-Up periods were the times during the year when the school's pedagogic practices most closely resembled reformers' pedagogic fixations. They were also the moments that drew most heavily on idealizations of creative and high-tech work practices that have been valorized as a new model of work and citizenship in many parts of the globe (Lindtner 2014; Irani 2015). Socially, educators organized students into groups of eight to ten, each of which had an adult advisor. Adults still defined the overall challenge for each Level Up, but much of the design and building of the projects was left up to the students. In keeping with the school's ideals of a student-centred pedagogy, educators mostly played a supportive, rather than a controlling, role. They waited for students to request their assistance and stepped in only when conflicts between students seemed to be especially tense. The students negotiated with one another about what

they should do next, struggled to implement their decisions, failed to produce expected results, passed judgments (both positive and negative) on one another's ideas and efforts, revised their plans, argued with one another about who should do what and so on.

Students also spent a lot more time talking than they did during a normal school day, and the overall volume in classes was noticeably higher. At one point, a teacher who was running a class on the floor beneath the Downtown School even came upstairs to complain about the noise because his students were taking an exam. The organization of students into teams also broke with the individuating tendency of many of the school's other pedagogic practices. While there were many internal disagreements over the direction of each team's project, each group oriented towards a common production. A common stake and say in the outcome of the project supported these more cordial relations.

Assessment was also more open-ended and distributed during Level Up. At the end of the first Level Up, the school showcased the students' Rube Goldberg machines for parents and an outside panel of judges (mostly professional designers). The judges offered verbal feedback about what they did and did not like about each machine, and they awarded one team a prize for the best machine, but as far as I know, no individual grades were given. Further, students and teachers talked informally about the various projects, but they did so more as partners than in normal routines in which educators were the presumed experts.

In terms of space and equipment, educators reorganized classrooms so that rows of forward-facing desks were broken apart and clustered into workspaces. Educators gave each team one-half of a classroom that they could use as a dedicated workspace for the entire Level-Up period. Educators also provided teams with a hodgepodge of scrap materials, from cardboard tubes to toy cars, PVC pipes, rulers, tape, weights, marbles and so on. Educators allowed students to make a mess and leave their materials and in-process productions in their workspaces throughout Level Up. Unlike normal classes, educators did not confine students to their seats, and many students moved fluidly around the classroom. Temporally, the school day had only a few divisions. Students worked on their projects for hours at a time and educators made few references to the urgency of clock time. At any given moment, some students were off task, but educators generally did not intervene. Some students told their peers to stop wasting time, and sometimes a student asked an educator to direct their peers to participate. In general, though, Level Up felt much less scripted and less rushed than a typical school day.

Some other schooling practices also approximated reformers' pedagogic fixations, albeit not as closely as Level Up. For example, the episodic moments in which classes communicated with characters from designed game worlds were substantively unconventional for a school. Similarly, the requirement that all students take a media arts course focused on game design was somewhat unique. Other unconventional practices included the occasional small projects,

the few times during the trimester when classes used the school's 'semi-immersive embodied learning environment', and the school's after-school programmes that focused on making, hacking and remixing media and technology.

As shorthand, I refer to these moments when the daily life of a disruptive intervention most closely approximates reformers' philanthropic idealizations as sanctioned counter-practices. The phrase is meant to draw attention to how these activities are indeed different from the more conventional, and bureaucratic, processes that reformers aim to disrupt; they are counter-practices. Yet, they are also deviations that are permitted and valued by people in positions of institutional authority: sanctioned counter-practices.

The project's designers and backers tended to treat these unconventional practices as indicative of what the project was all about, but I found them more of a carnivalesque inversion of disciplined routines and orders.[7] While moments of sanctioned counter-practice were often inspiring, they were also relegated to a few carefully bounded times during the day or school year, reformers and educators were not able to expand them and, if anything, they became less a part of the school's routines as it aged.

Sanctioned counter-practices became less prevalent as the school aged for several reasons. For one, and as already discussed, the school's designers had assumed that their game-like pedagogy would motivate subordinates' voluntary participation in managerially scripted activities. When this did not happen, educators ratcheted up discipline in an attempt to restore managerial authority and enforce compliance. Additionally, privileged parents mapped their anxieties about some of the school's less-privileged students onto assumptions about educator permissiveness, thus pressuring educators towards more adult-controlled models of schooling. Third, the mandate to produce competitive scores in state exams constantly hung over reformers' and educators' heads, and both privileged and less-privileged parents pressured educators to devote more time and attention to preparing students for these exams. These parents did so not necessarily because they saw the state exams as indicative of what their children had learned, but because they saw them as key to their children's mobility in broader educational systems. As one professional parent wrote in an e-mail to other parents and the school's leaders, 'I don't like these tests more than anybody else. I actually pretty much despise them. But these are the rules made by the State. I don't make them. I just follow them.' Many less-privileged parents and caregivers were especially concerned about test scores because their children's access to other middle and high schools were so dependent on these scores. More-privileged families, by contrast, had greater access to various educational alternatives, as well as private tutoring for test preparation, and yet many privileged families also pressured educators to focus more on testing. Further, the market-like choice system was designed to increase competition between schools and, subsequently, between students, largely on the basis of test scores. As such, as the school aged, educators dedicated less time to sanctioned counter-practices and more time to test preparation, especially after the

school's first-year scores fell below those of peer institutions. In the school's second year, educators even dedicated the entire Level-Up period at the end of the second trimester to test preparation.

Against the magnitude of these unwieldy forces, sanctioned counter-practices begin to look less like seeds of transformative change and more like rituals that not only release the pressures generated by an increasingly disciplined and oppressive social order, but which also help affirm and repair many people's moral feelings about the project and hopes for change. One of the most striking characteristics about the Downtown School's sanctioned counter-practices was that despite being relatively marginal and insubstantial compared to the school's daily routines, they were overwhelmingly featured in the school's publicity materials, showcases for parents, festivals, open houses, tours for the press, planning documents, e-mail blasts, academic reports, journalists' stories and other venues and rituals where the reformers and educators staged self-representations of the school.[8] By contrast, the school's more canonical practices were almost entirely absent from these self-representations.

The vignette at the opening of this chapter illustrates this dynamic playing out. The school's designers, leaders and a visiting journalist entered the back of the classroom right before the teacher introduced the game-like interaction with the sock puppets, a moment that was playfully unconventional for a school. Yet, they left as soon as the class returned to familiar schooling practices. The vignette at the opening of Chapter 2 (Sims, 2017: 24) also illustrated a similar process as journalists and tour guides focused on and staged the school's most cutting-edge technologies and practices while overlooking and even actively excluding its many conventional features—for example, by moving the student working on video-game design out of the classroom and into an empty hallway. What is more, these stagings were always celebratory and they often, but not always, featured the project's distinguishing technologies, such as the semi-immersive embodied learning environment, which, as noted earlier, was rarely used. Additionally, design and media professionals who worked for the non-profit that designed and helped run the school crafted many of these self-representations, and their sophisticated media-production skills lent the representations a heightened sense of professionalism and, hence, legitimacy.

Some readers may be tempted to interpret this elevation of sanctioned counter-practices over more-conventional everyday routines as mere propaganda or public relations. I do not find such interpretations convincing, at least not in projects where many practitioners make significant personal and professional sacrifices in order to practise a form of work that they see as caring and philanthropic. In practice, the periodic elevation of sanctioned counter-practices over everyday routines did not seem to so much conceal reformers' real intentions as help the school's designers, educators and powerful backers realize the collective experience of having good intentions and being cutting-edge. These seeming verifications of the project's idealized potential mattered to reformers, educators and their supporters because the celebration of sanctioned counter-practices

helped produce and sustain the sense that they were committing themselves to something that was both morally good and original. The unusual amount of outside attention, and especially media attention, that the school's sanctioned counter-practices received also helped reaffirm these sentiments.

It would not be a stretch to suggest that sanctioned counter-practices—and the celebratory rituals that surrounded them—often had a quasi-religious inflection to them, in the sense that, when they worked, they helped produce a collective sense that we were participating in something larger and good; I found that they engendered feelings of belonging not just to one another, but also to a forward-looking moral project. Not coincidentally, similar moral sentiments animated the entrepreneurial reformers' (Becker 1963) calls for disruption, and they were repeatedly reinforced by the media's upbeat stories about the school.[9] Given that the school's designers' relied on these powerful outsiders in order to follow up on their insights and yearnings, the collective celebration of sanctioned counter-practices likely helped sooth some of the discomforts of inhabiting this compromised position as it engendered feelings of harmony across various divisions of power.

A brief account of one of my own experiences participating in a sanctioned counter-practice will help illustrate these last points. As mentioned earlier, educators rarely used the school's most spectacular technology, the semi-immersive embodied learning environment, even though it was prominently featured in many public-facing representations of the school. But when the technology was used, nearly everyone treated the occasion as special. One of the school's well-known founders usually ran these sessions, along with two technologists who worked at one of the local universities. The technology required a large white mat that took up about half the room to be laid across the floor, onto which the visuals of an educational game were projected from overhead. Players would interact with the projection on the floor by moving highly reflective Styrofoam balls that a series of cameras around the perimeter of the room could detect, hence allowing the projected imagery to respond, seemingly magically, to the players' gestures. Normally, I did not participate in these games since only a few people could play at a time and I did not want to detract from the students' time with the system. But on one occasion I joined a group game that involved trying to navigate a virtual boat to collect virtual coins while avoiding virtual alligators.

While playing the game with several students, I lost my sense of self-awareness and social differentiation. I felt as if I were part of a collaborative endeavour that was greater than myself, even though the other players were 11 and 12 years old and who, under normal circumstances, were socially differentiated from me. I am fairly certain the other players felt the same, as did many of the other students and staff who cheered us on.[10] When I wrote my field notes that evening, I had an unusually hard time recalling the specifics of the game or how it worked, but the intense feelings of excitement, wonder and belonging that it engendered were still vivid. I am sharing this anecdote not to add yet another account of what play or flow feels like as a psychological experience—the

school's founders called it the rise—but instead to help illustrate how collective experiences with unfamiliar and awe-inspiring technologies can help produce a sense of belonging and enthusiasm not just for the sanctioned counter-practice, but also for the larger collective undertaking that the unconventional practice seems to represent.[11] Later in the day, the designer who had helped design and run the game said to me with seeming excitement, 'It was great to see you get lost in play today!' Her comment stayed with me not just because it had indeed been great to be lost in play, but also because our shared enthusiasm seemed to join us in a way that I had not felt previously. To me, it felt like the enthusiasm that people share after having attending a good concert or sporting event, an excitement rooted in part in the shared recognition that they had together experienced the rise. When experienced as part of a disruptive philanthropic undertaking, these enchanting and exhilarating feelings seemed to epitomize the project's novel and moral promise.

Such feelings surfaced on numerous occasions throughout my time in the field, especially when media outlets visited the school or when the school staged festivals of the students' sanctioned counter-practices for parents and other outsiders. During such moments, I often could not help but share good feelings about the project, and my memories of these moments have repeatedly tempted me to write a more celebratory account of the school. Doing so not only felt like a kind thing to do for the well-intentioned people who had so generously welcomed me into their project, but it also would have helped me feel more hopeful about, and pleased with, the sort of work I have tried to do for much of my professional life.

Conclusion

I am convinced that most people who design and implement disruptive philanthropic interventions sincerely want to promote what they consider to be beneficial social change. But their ability to do so is compromised from the start by the outsized expectations that are placed on them, as well as by the fairly limited means that they have available. Experts' reliance on powerful outsiders for resources and recognition allow the former to imagine and launch new experiments, but they do so at a cost. In responding to these outsiders' calls for disruption, experts translate broader concerns with the present and hopes for the future into technical diagnoses and prescriptions: they problematize what is wrong with existing remedies, while imagining seemingly new and better ones that will take advantage of the unprecedented opportunities of recent technological breakthroughs. In doing so, they promise social transformations that their philanthropic interventions do not have the power to bring about.

The reformers who founded the Downtown School translated broader concerns with the present, as well as hopes for a promised democratic polity, into a seemingly disruptive pedagogy. They problematized dominant pedagogic

approaches for failing to live up to democratic ideals and designed what they imagined would be more engaging, relevant and equitable pedagogic practices. They saw in video games and new digital media unprecedented opportunities for doing so. And yet most of daily life at the Downtown School ended up looking much like daily life at a more-conventional school, and it became even more conventional as the Downtown School aged. Despite reformers' aspirations for a student-centred pedagogy, students had little say over either the goal or the mode of their activities. At nearly all points during the day, educators directed students to enact tightly scripted behaviours, often these scripts were broken into fine-grained step-by-step instructions and non-compliance was increasingly reprimanded. Even during recess, students were subjected to near-constant surveillance and strict limitations on their behaviour. Much of what ended up being playful and unconventional about the Downtown School was the terminology that reformers used to describe canonical schooling practices. And yet, despite all this conventionality, many of the people who had committed themselves to the project maintained the sense that the school's pedagogic practices were both philanthropic and cutting-edge. How should we make sense of this rather wide gap between ideals and acts?

I have been arguing that reformers become fixated on what they can foreseeably control and transform with the new means that they have available. In the context of a concrete reform project, reformers translate broader yearnings for social change into narrow problems and solutions that their new tools can foreseeably fix, even though many of the factors and forces that will constitute the project, not to mention the social problems that a project is designed to address, extend far beyond reformers' reach. Reformers tend to conceptualize their projects as if they can dismantle and reassemble inherited worlds and systems when their projects are also, and more so, assembled by these worlds and systems. The reformers and educators who founded the Downtown School could not control much of the curriculum, many aspects of the school's physical space, the mandate to administer state tests, the age-graded organization of schooling, the allocation of funding per pupil or, critically, whether students would desire and enjoy the version of fun that the school was offering. What reformers and educators could more easily transform was some of the terminology and equipment they used within the school. They could also more easily transform how they represented themselves to themselves and outsiders. And they were able, more or less, to realize their pedagogic ideals during small and bounded periods that temporarily held at bay aspects of the project that they could not otherwise control.

An important feature of these pedagogic fixations is that they entailed substantial blind spots that revealed themselves only once unanticipated forces overflew reformers' plans and started destabilizing the project in ways that appeared to threaten its survival. In facing this instability, the dominant tendency of reformers and educators was to engage in a different sort of fixation: reformers and educators quickly reached for resources that could stabilize the

project; ironically, many of these resources came from canonical versions of the institution that reformers aimed to disrupt. Set against such tensions and contradictions, moments that more closely approximated reformers' pedagogic ideals, what I have been calling sanctioned counter-practices, took on an experiential and symbolic significance that far exceeded their role in the project and that was in no way commensurate with their potential to bring about substantive social change.

Notes

[1] Educational game designers refer to this form of 'edutainment' as the 'chocolate-covered broccoli' approach, a phrase whose origin is frequently attributed to Laurel (2001). What is puzzling is that the designers of the school knew about and even shared this critique of edutainment and yet they also appeared to believe that they were doing something more substantively transformative.

[2] I find parallels between this management technique and the 'scrum' and 'sprint' techniques used in Agile software development. In both cases, managers impose an ambitious temporal constraint on collective tasks, and in doing so they can make the tasks feel urgent and important. As those who have worked in start-ups know, this feeling of being constantly rushed can be quite intoxicating and can help motivate employees. The original metaphor seems to have been taken from rugby, a highly physical and competitive sport that can evoke a similar rush among players.

[3] Each Wednesday afternoon, educators, school leaders, some of the school's designers and often representatives from the school's SSO held a professional development session. While I was not able to observe these meetings, I noticed that all the educators would introduce a new technique at the same time, typically following a professional development session. I got the impression, confirmed in some informal conversations with educators, that professional development sessions were often a mechanism for distributing classroom- management best practices among educators. More experienced educators and school leaders appear to have introduced some best practices, but others appear to have come from the SSO. In subsequent conversations with educators from other schools, I have learned that many of these techniques are quite pervasive in contemporary urban public schools in the United States.

[4] When the school moved into its new home, they were able to renovate some of these spaces, but they could not change basic architectural arrangements, such as classrooms.

[5] In response to didactic and infantilizing lessons, students would often express solidarity with their peers by doing things like making eye contact and rolling their eyes or, more confrontationally, by pretending for educators that they were in fact ignorant about the lesson, hence baiting

educators to offer even more didactic instruction, a response that could delight other students when the educators took the bait.

[6] Anthropologists and qualitative sociologists have long observed such dynamics in the processes by which persons learn to become members of a social group. See Geertz (1972) and Weider (1974) as classic examples. Such rites of passage are especially common in tightly knit organizations like fraternities and sororities, boarding school, the military and the police.

[7] See Stallybrass and White (1986), who drew on Mikhail Bakhtin. See also Taylor (2007), who drew on Victor Turner's (1969) analysis of relations between structure and antistructure in rituals.

[8] Anthropologists and cultural theorists have long drawn attention to the importance of these ritualistic stagings of group self-representation. My interest is in a variant of these stagings in which insiders present themselves as counter-normative in moral terms.

[9] For a similar account of the production of effervescence in contemporary software production, see Fred Turner's (2009) analysis of relations between Burning Man and Google. Turner draws in part on Durkheim's famous analysis of the basis of religious feeling, but argued that such ritualized practices are central to contemporary models of tech production. As already noted, such models informed the plans for the Downtown School.

[10] The phenomenology of these sorts of experiences has been documented in different disciplines and discourse communities, perhaps most famously in Csikszentmihalyi's (1990) notion of *flow*. The designers of the Downtown School referred to such experiences as 'the rise', which has much in common with other notions that have recently become popular among tech-ed reformers, one of which, 'geeking out', I helped propagate (see Ito et al. 2010). In the schooling context, I see sanctioned counter-practices such as these as akin to the Friday night football games that constitute such an important community ritual at many more conventional American high schools.

[11] David Nye's (1994) historical study of what he calls the *American technological sublime* reaches a similar conclusion about the potential for new technologies to engender feelings of awe and belonging, but Nye focuses on the project of constructing an American national identity. In my case, the subliminal power of new technologies also contributed to reverent feelings of belonging, but with respect to the philanthropic initiative of which they were a part. See also Leo Marx's (1964) discussion of the technological sublime, as well as Vincent Mosco's (2004) analysis of the digital sublime.

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CHAPTER 11

Bildung in a Digital World

The Case of MOOCs

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Introduction

Imagine a student enrolling in an Introduction to Philosophy course. She checks the required readings, sources the relevant materials and blocks out the required time in her agenda. The course begins with the question, 'What is philosophy?' She is not in a lecture hall or a classroom. No students shuffle uncomfortably in their seats and no professor stands waiting for an answer. Rather than blurting out her thoughts or raising her hand, she begins to type. As she does so, perhaps two, perhaps 2,000, fellow students are considering the very same question from Amsterdam to Hong Kong.

'Introduction to Philosophy' is one example of a massive open online course, (MOOC) which is offered by the University of Edinburgh. It ranks in the 'top fifty most popular MOOCs of all time', with over 500,000 enrolments since 2013.[1] MOOCs were expected to revolutionize higher education, not only on account of their promises of 'massiveness' and 'openness', but also because they

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allow students greater flexibility and tailor-made programmes. Since *The New York Times* declared 2012 'the year of the MOOC', MOOCs have frequently been touted as key to the future of universities where students will be 'declaring missions, not majors'.[2]

MOOCs offer many advantages, allowing people to study wherever and whenever they want, interacting with leading scholars and other students from around the world. They also promise to broaden access to those who do not have the opportunity or means to participate in traditional forms of location-based higher education, and to allow older people to 'up-skill', re-train or simply enjoy the pleasures of learning. Against these democratizing and empowering claims, some humanities scholars have voiced scepticism as to whether MOOCs can deliver the sort of intellectual training and personal cultivation (*Bildung*—discussed more extensively below) that is provided within the walls of the university, where staff and students interact face-to-face, in relatively intimate settings, to discuss issues they deem important rather than being driven by external definitions of relevance. MOOCs are seen as the antithesis to such an ideal. Instead of promoting critical engagement with ideas, they are dismissed as marketing or entertainment, or more seriously, as an attack on academic labour and a means of instrumentalizing humanities education (Bogost et al. 2013; Hall 2015).

In this chapter, we critically examine both the promises and despair surrounding MOOCs (building on the more general discussion in the opening chapter to this volume by Stocchetti). We do so from a perspective that takes the materiality of education seriously. In other words, we recognize that all educational forms are technologically mediated, and all have an important material dimension that shapes interactions between staff and students, as well as among students themselves. To do this, the next section provides a brief outline of the development of MOOCs. We then explore the most common humanist objections against them, and show how these objections may be justified, as MOOCs can be seen as incompatible with *Bildung* and the values of the humanities. But we also go on to question the extent to which MOOCs really do threaten these values by focusing on the advantages and disadvantages elicited from people's experiences with MOOCs so far. We suggest that far from confirming the sceptics' perceived incompatibility between a technology-intensive environment and the *Bildung* ideal, experiences with MOOCs to date may actually serve to promote several of the values of the humanities.

A Decade of MOOCs

The objective of the first MOOC, launched in 2008, was to explore the potential of an online platform, focusing on knowledge transmission through networked practices and decentred learning experiences (Downes & Siemens 2009). Today, there are two distinct categories: the cMOOC ('connectivism') and the

xMOOC ('exponential' or 'extended'). The cMOOC is the progeny of the first MOOC created in 2008 and is typically dialogical, emphasizing interaction between learners. The xMOOC, on the other hand, is modelled on the typical content delivery method of traditional university teaching (Stewart 2013) and is thus seen as a scalable extension of the university (e.g. HarvardX and MITx) (Hollands & Tirthali 2014). The first xMOOC was in 2011, when Stanford professors attracted over 160,000 students for a course on artificial intelligence (Markoff 2011; Waldrop 2013). While some continue to experiment with cMOOCs, xMOOCs are now dominant among the main providers of MOOCs: Coursera, EdX and Udacity.[3] Disagreements abound about the exact differences between the two models; however, a crude characterization is as follows: in an xMOOC you sit and watch a video, in a cMOOC you collaboratively produce the video (Bruff 2013). As Hollands and Tirthali state, according to the creators of the two platforms, there are 'radical differences in goals and structure of these learning experiences, with the only commonalities being that they are scalable and technology-based' (2014: 18). Recent studies point to further diversifications within MOOCs, for example, pMOOCs ('problem' or 'participant' based) and qMOOCs ('quality' based) (Jansen & Schuwer 2015), as well as further derivatives of the MOOC model, such as POOCs (Personalized Open Online Courses) and SMOCs (Synchronous Massive Online Courses) (Hollands & Tirthali 2014). However, it is the predominance of xMOOCs that fuels fears that MOOCs are primarily being embraced for their profit-making ability rather than their pedagogic possibilities (Bulfin, Pangrazio & Selwyn 2014; Kovanović et al. 2015).

Following the first course offered by Stanford in 2011, two annual reviews of the MOOC-space, 'The MOOC juggernaut: one year later' (Shah 2012) and 'The MOOC juggernaut: year 2' (Shah 2013), both discuss the huge surge in enrolments and document the hype and excitement that surrounded MOOCs in the early years. In a survey conducted in 2013, the most cited reasons for institutions engaging with MOOCs were to 'increase the visibility of the institution' (27 per cent) and to 'drive student recruitment' (20 per cent). The third most cited reason was 'innovating pedagogy' (18 per cent) (Allen & Seamen 2013). A further qualitative study similarly asked, 'How and why are institutions engaging with MOOCs?' (Hollands & Tirthali 2014). Of the six goals they identified, 'building and maintaining brand' was identified as important by 41 per cent of respondents and 'improving economics by lowering costs or increasing revenues' by 38 per cent. 'Extending the reach of the institution and access to education' was ranked most highly, by 65 per cent of respondents. The other three goals included 'improving educational outcomes for both MOOC participants and on-campus students' (38 per cent), 'innovation in teaching and learning' (38 per cent) and 'conducting research on teaching and learning' (28 per cent) (ibid.).

Two discourses have dominated the literature in recent years (BIS 2013). The first is that of the 'enthusiasts' who have 'welcome[d] the shake-up and energy MOOCs bring to learning, teaching and assessment' (ibid.: 4). The emphasis

is on positive experiences with 'innovative formats of pedagogy, and spotlight themes such as access, empowerment, relationship building and community' (ibid.). The discourse of the 'sceptics … serve[d] to temper the general enthusiasm' (ibid.). They point to challenges which have been left unresolved by previous generations of online learning, suggesting they 'suffer from weaknesses around access, content, quality of learning, accreditation, pedagogy, poor engagement of weaker learners, exclusion of learners without specific networking skills' (ibid.).

However, neither the enthusiasts nor the sceptics are saying anything new (see Stocchetti, Chapter 1, in this volume). Every change in the means of delivering education has prompted debate. Socrates feared that writing, a very early information technology, would lead to a decline in the quality of learning. Ironically, we know this because Plato took the liberty of writing down Socrates' concerns in the *Phaedrus*. These included the fear that writing would become a substitute for memory and thought so that students would later simply repeat what they had heard rather than thinking for themselves, and that interaction between teacher and student would decline (Everard 2000).

Leaping ahead to the 20th century, radio and television were taken up by both broadcasting and educational organizations. Since its establishment in the 1920s, the BBC's mission has been 'to enrich people's lives with programmes and services that inform, educate and entertain'.[4] The Open University in the United Kingdom, established in the 1960s, offered higher education to non-traditional students in non-traditional ways (largely distance learning to older people who for whatever reason had not gone to university when they were 18). It worked closely with the BBC, and later commercial broadcasters, to produce high-quality learning materials to accompany their books and face-to-face meetings. Television programmes are not always erudite nor educational, but there is no a priori reason why radio and television programmes cannot be produced to support *Bildung*.

After the World Wide Web became available in 1993, similar debates again took place. This technology with global reach was heralded as offering the potential to provide information to the entire world at very low cost. For example, the UK Fryer Report (1997) was very optimistic about the possibilities:

> New digital technologies will create learning opportunities which are not dependent on being available at a particular time and place. Learning at home and outside conventional educational establishments will become more widespread—with implications for institutions, teachers and content creators (like broadcasters) as well as individual learners. Tailoring resources to individual needs will eventually become possible. (Fryer 1997: 15)

This certainly pre-figures contemporary debates about the possibility of MOOCs to offer personalized education beyond the university, and to support

the widening of access to higher education. At the same time, digital technologies are often seen by policymakers and university managers as part of the solution to declining resources and greater competition between universities (Brown 2000).

The point of this very condensed pre-MOOC history about the use of technology in the delivery of education is threefold. First, debates about how best to engage students with knowledge and ideas are not new. Second, new developments in the means of recording and sharing information are always accompanied by debates about their suitability for educational contexts. Third, when technologies are new, they have potentials, and how those potentials are ultimately realized depends not only on the technological affordances, but also on the social and political contexts in which they are introduced.

Voices of Dissent

Scholars in the humanities have harboured a number of concerns about MOOCs. These relate to their overall desirability and purpose within the broader landscape of higher education, as well as to how they are taught. The city and the factory (Feenberg 2002) are useful metaphors for thinking about why humanities scholars make their objections to MOOCs. The city exemplifies the ideals of liberal education, as articulated via the notion of *Bildung.* The humanities engage with artistic, literary and cultural expressions of what it means to be human. According to the city model of education, dialogical exchange with a diverse community of individuals is key to one's self-development and intellectual growth as a critical intellectual well versed in reading, interpretation and writing. This city model of education is then presented as being under attack by a factory model. The factory is oriented towards efficiently producing employable citizens for a society in which science and technology are the dominant currency, thus contributing to the commodification of knowledge which is being delivered in neat packages in a cost-effective and time-efficient way, with the objective of increasing profits (see Hall, Chapter 7, in this volume). MOOCs are therefore considered to be incompatible with broader human values and the formation of intellectual character.

What is salient in such debates is how technology automatically, and certainly unreflectively, gets linked to the factory rather than the city. This can also be seen in the discussion about digital humanities. Although hailed by some as saviour of the humanities (Straumsheim 2014), others resist this 'evangelical discourse' on digitalization (Hamilton 2016). Fish has notoriously attacked digital humanists for fetishizing technology at the expense of genuine intellectual enquiry, suggesting that 'the more the focus has been on disciplines where computational skills are central, the greater the erosion of the skills we refer to as "critical thinking"' (2013). He has also asked whether 'the technologies wielded by digital humanities practitioners either facilitate the work of the humanities, as

it has been traditionally understood, or bring about an entirely new conception of what work in the humanities can and should be?' (2015: 349) Fish's charges received support from Allington, Brouillette and Golumbia (2016):

> What digital humanities is not about, despite its explicit claims, is the use of digital or quantitative methodologies to answer research questions in the humanities. It is, instead, about the promotion of project-based learning and lab-based research over reading and writing, the rebranding of insecure campus employment as an empowering 'alt-ac' career choice, and the redefinition of technical expertise as a form (indeed, the superior form) of humanist knowledge.

All of these claims attest to the notion that when it comes to the relationship between technology and the humanities, there is a perceived trade-off between incompatible values, between the city and the factory.

This same opposition can be observed in the discussion about MOOCs, where two lines of argument can be discerned, one primarily in economic and political terms, the other more in pedagogical or educational ones. In the remainder of this section, we tease out both lines of critique. After mapping the objections against MOOCs, later sections explore which of those could be remedied by re-designing MOOCs, which ones point to insoluble shortcomings of MOOCs and which ones have to be dismissed because humanities-oriented values might actually be better served by MOOCs than by traditional forms of education.

Economic and Political Concerns

Bogost succinctly summarizes the main economic or political objections against MOOCs: 'MOOCs are a type of marketing', 'MOOCs are a financial policy for higher education', 'MOOCs are an academic labour policy', 'MOOCs are speculative financial instruments', 'MOOCs are an expression of Silicon Valley values' and 'MOOCs are a kind of entertainment media' (in Bogost et al. 2013). We examine each of these concerns in turn.

A number of scholars have claimed that MOOCs are no more than a 'clever marketing ploy' used by elite universities (Bulfin, Pangrazio & Selwyn 2014). They object that universities have little interest in providing quality education through MOOCs, but rather their main interest is in profiling their names and attracting attention, particularly through showboating their superstar professors. For example, while discussing the launch of the British MOOC platform FutureLearn, a senior advisor voiced concern that the platform was a mere marketing exercise: 'Increasingly, it feels that universities finding themselves in a competitive market for attracting students have seen MOOCs as a commercial opportunity … focused on business goals rather than pedagogical [aims]'

(Parr 2012). As we saw above, a number of studies have indicated that universities pursue MOOCs to indeed 'increase the visibility of the institution', to 'drive student recruitment' and to 'build and maintain brand' (Allen & Seamen 2013; Hollands & Tirthali 2014).

The second critique is that MOOCs are a financial policy for higher education. Here, the digitalization and marketization of higher education are seen as complicit in its instrumentalization. Critics characterize the changing contexts of knowledge production in terms of academic capitalism (Slaughter & Leslie 1997), post-academic science (Ziman 2000) or triple-helix relations (Etzkowitz & Leydesdorff 2000). All of these notions point to the increasing role of market-driven incentives and goals, as well as to the importance of digitalization with respect to 'audit culture' and accountability (Strathern 2000).

All of which, through their bias towards deliverable outputs and quantifiable measures, are perceived to present a considerable threat to the humanities. Buzzwords like 'accountability' and 'employability' dominate higher education and while many disciplines may be well prepared to withstand such terrain, the humanities increasingly feel the imperative to justify themselves, thus rekindling repetitive debates over the 'useful' versus the 'useless' in instrumental terms (Collini 2012).[5]

Bogost's third critique is that MOOCs are an academic labour policy. Online education more broadly, and specifically MOOCs, are seen as the final nail in the coffin for the liberal arts model, the historical custodian of humanistic values. In its place, online education is seen as heralding the era of the 'corporate campus' (Aronowitz & Giroux 2000) or the 'digital diploma mill' (Noble 1998). Academic freedom is perceived as being substituted for the facilitation of profit making, while increased managerial control results in the prioritization of efficiency and accountability (Levidow 2002). In the mid-1990s, David Noble argued that online education would result in a narrowing and deskilling of faculty staff. Critics of MOOCs today share similar fears. Canavan claims:

> MOOCs hyper-accelerate a long-term trend toward adjunctification and labor devaluation in the university. I find it's a labor model in search of a pedagogy. The real interest is in how can we de-skill and de-professionalize academia even further, transforming tenure lines into low-wage work, and 'managing content' in MOOCs for tens of thousands of students at a time. I am amazed that so many professors are so eager to experiment with a pedagogical model that is not only ineffective, but which actively seeks to obsolesce them and the work they do. (Canavan 2013: 3)

He is not alone in his dismay. Writing for the UK newspaper *The Guardian*, Wilby (2014) similarly states, 'Only the elite institutions flourish because everybody prefers output from, say, Oxford or Harvard; and higher education, turned into a mass market industry, settles into uniformity with a few courses and a few

star lecturers.' He points out that journalists already had to face the same situation: 'Some critics warn of a future in which thousands of academics lose their jobs (echoing journalists who work for newspapers that lack an online paywall, many ask "why give away our content for nothing?")' (ibid.). In 'Outsourced lectures raise concerns over academic freedom', Kolowich (2013a) discusses fears concerning autonomy with regards to MOOCs. He states that 'where state legislators and college administrators see an opportunity, some professors see a threat—if not to their jobs, then to their freedom to teach a course as they believe it should be taught'. In 'Faculty backlash grows against online partnerships', Kolowich (2013b) discusses an open letter to Michael Sandel from philosophy professors at San José State University (SJSU) in relation to a course he was offering via the edX platform. The letter was sent after they had refused to use material from Sandel's Harvard course, 'for fear that California State University administrators were angling for a way to eventually gut their department'. They went on to declare concerns for a 'future in which local faculty become mere caretakers of courses designed by professors at elite universities' as MOOCs 'replace professors, dismantle departments, and provide a diminished education for students in public universities' (SJSU Professors 2013).

The fourth and fifth objections, that MOOCs are speculative financial instruments and an expression of Silicon Valley values, are closely interrelated. Discussing recent developments in MOOCs, where the latest trend appears to be a shift towards online degree programs, Shah (2018) speaks of a second wave of MOOCs emerging. He suggests that the huge amounts of investment and resources being thrown into what is essentially an unknown business model closely resembles the first wave of MOOC hype in 2012. He states:

> The recent spate of online degree announcements and the resources being spent by MOOC providers and universities alike is giving me a feeling of *déjà vu*. That's because the major MOOC providers are all jumping on the bandwagon, announcing partnership after partnership and degree after degree.

As was the case when MOOCs first came onto the scene, universities seem to see their potential in terms of generating revenue and have thus been quick to jump on the bandwagon. A number of American universities cite the possibility of 'improving economics by lowering costs or increasing revenues' as a key reason for their interest in MOOCs (Hollands & Tirthali 2014), despite this having been speculative right from the start. Critics see MOOCs as an expression of Silicon Valley values, prioritizing profitability at the expense of traditional education values. Harris and Alter (2018) summarize the culture of Silicon Valley in terms of its 'laid-back California way of life', the 'commitment' of the people who work there, the 'competitive' nature of business and the powerful motivation of the 'extrinsic reward of financial remuneration'. They go on to suggest:

> What really drives Silicon Valley companies is an emphasis on getting things done quickly rather than agonizing over every potential flaw. A sign painted on a wall at Facebook summarizes that attitude: 'Done is better than perfect'. (Harris & Alter 2018: 2)

According to the critics, this mantra exactly captures the way in which MOOCs have been developed.

The final objection is that MOOCs are a kind of entertainment media, and indeed, the language used to describe MOOCs is often borrowed from entertainment media. For example, they are 'blockbusters' which give rise 'to a new era of rock star professors' (Merritt 2012; Young 2018). One professor involved states, 'It's not like a university course where they have to be there in order to get certified … People are doing this on their own time! They're actually sitting back and watching this almost as entertainment' (Young 2018). Some universities have even hired specialist companies to keep production value high, as well as involving celebrities from popular TV shows to 'get the audience's attention' (ibid.).

Pedagogical Concerns

These economic and political objections hint at a lower quality of education being offered via MOOCs, but they only indirectly touch on pedagogical issues. Four such issues can be found in the writings of humanities scholars: MOOCs do not allow for Socratic exchange; MOOCs are impersonal; MOOCs do not train intellectual virtues such as open mindedness and intellectual courage; and MOOCs cannot offer the training of skills considered essential to the humanities. All of these objections are linked to the ideal of *Bildung*. Often interpreted as self-formation or self-cultivation, *Bildung* does not concern pure subjectivism as these terms might imply. Individuals only achieve the ability to be subjective by being initiated culturally within their society. Central to *Bildung* is the process whereby an individual develops this capacity through engaging with others and interacting with cultural objects. There is a constant interplay between the individual and the community in terms of their language, customs and traditions.

As *Bildung* is thought to entail specific educational forms, this brings us to the first pedagogical issue raised by defenders of the humanities. A key defining feature of humanistic scholarship is that it is dialogic, 'i.e. it is closely dependent on permanent negotiations of meaning, on processes of dialogue, confrontation, interpretation, translation, that … are constituted by the dialogic relationship itself' (Ribeiro 2012: 91). Similarly, the dean of the School of Humanities and Sciences at Stanford states, 'The humanities have to deal with ambiguity [and] with multiple answers', which means that they 'benefit hugely from the exchange of different points of view [and] different arguments' (Reichard

2013). The humanities thus favour the 'Socratic method' which centres upon the activities of questioning, exposition and reflection, and has always been contingent upon synchronous, face-to-face settings, wherein listeners can ask for clarification, requiring the speaker to reformulate and reflectively defend their own perspective (Murray 2000). Many criticisms of MOOCs regard their lack of dialogic exchange. Dialogue is deemed incompatible with large scale, virtual and anonymous MOOCs. For example, Harris (2013) states:

> If we take ourselves out of that dialogue, out of the give and take of draft and response and revision, then we are no longer teachers but content providers. Well-designed assignments and curricula are important. But they are only the very start of good teaching. A textbook is not a course. And I don't see how a MOOC can be much more than a digitized textbook.

This leads their critics to conclude that MOOCs are a priori inadequate platforms for humanities courses and, indeed, even the co-founders of the Coursera platform, Koller and Ng, have admitted that humanities MOOCs are extremely difficult to provide, owing to their dependence on Socratic dialogue, interpretive methods and qualitative feedback.[6]

The second objection, that MOOCs are impersonal, is closely related to the first one. The SJSU philosophers state that, in traditional classrooms, 'the students not only have a teacher who is passionate, engaged and current on the topic, but, in classes, [through] independent studies, and informal interaction, they are provided the opportunity to engage a topic deeply, thoroughly, and analytically in a dynamic and up-to-date fashion' (SJSU Professors 2013). Without this sort of relationship being present, many question what sort of intellectual training can possibly be provided. In response to their letter, Sandel agreed, stating, 'I strongly believe that online courses are no substitute for the personal engagement of teachers with students, especially in the humanities.' In support of this sentiment, and perhaps going one step further, Guthrie (2012) criticizes the fact that 'the Coursera model doesn't create a learning community; it creates a crowd. In most cases, the crowd lacks the loyalty, initiative, and interest to advance a learning relationship beyond an informal, intermittent connection.' He goes on to emphasize that 'whether face to face or online, learning occurs when there is a thoughtful interaction between the student and the instructor'.

The third pedagogical objection concerns the inability of MOOCs to train intellectual virtues. Intellectual virtues are part of an individual's epistemic processes and are developed as a result of habituation (Baehr 2011). Virtues like intellectual humility, open-mindedness and conscientiousness are then mobilized in intellectual actions like reasoning, interpreting, analysing and defining,[7] all of which are considered key aspects in the self-development of an epistemic agent—key aspects of *Bildung*. In 'What's the matter with MOOCs?', cultural historian and media scholar Vaidhyanathan (2012) states, 'Education is

the creation of habits of thought and methods of inquiry that yield unpredictable results.' The Senior Associate Dean for the Humanities and Arts at Stanford similarly claims, 'One of the most important things is to not just deliver information [to students] but to teach them how to reason' (Reichard 2013). Consider this reflection written by an American Studies professor in an article entitled 'MOOCs of hazard':

> Ralph Waldo Emerson wrote a long time ago. 'Truly speaking,' he said, 'it is not instruction, but provocation, that I can receive from another soul.' I first understood this distinction during my own student days, while struggling with the theologian Jonathan Edwards's predestinarian view of life. Toward the end of the course, my teacher, the scholar of American religion Alan Heimert, looked me in the eye and asked: 'What is it that bothers you about Edwards? Is it that he's so hard on self-deception?' This was more than instruction; it was a true provocation. It came from a teacher who listened closely to his students and tried to grasp who they were and who they were trying to become. (Delblanco 2013)

Here, Delblanco clearly considers that provocation was central to his development as an epistemic agent. Regarding the sort of intellectual training provided by the humanities, Vaidhyanathan states, 'We offer diplomas to people upon completion of a rigorous and diverse set of intellectual experiences—not the mere accumulation of a series of facts and techniques. Education is certainly not an injection of information into a passive receptacle' (2012). Similarly, the Senior Associate Dean for the Humanities and Arts at Stanford claims that, 'If we don't teach our students how to make knowledge, not just how to consume knowledge, then we're not doing what higher education is supposed to do' (Reichard 2013).

While teachers can transfer information about how to perform these practices to their students, it is in the repetition of their performance that these virtues become habituated. As MOOCs miss the dialogical and personal relation between teacher and student, they cannot create habits of thought, cannot transmit and train intellectual virtues, and cannot provide *Bildung*.

The final pedagogical objection raised by humanities scholars against MOOCs is that they hinder the practising of skills considered essential to the discipline. Reading and writing are central to the self-identification of the humanities. For example, Harpham argues that 'the scholarly study of documents and artifacts produced by human beings in the past enables us to see the world from different points of view so that we may better understand ourselves' (2005: 23). Training analytical skills is key to studying the humanities, but many humanities scholars deeply worry that it is getting increasingly difficult to teach these skills to students. Arndt (2006) suggests that 'humanists are failing to teach students to listen, speak, read, and write' (2006: 2). Digital technologies, including MOOCs, are identified as the root of the problem. The introduction

of new technologies, like smartphones and tablets, correlates with a decline in skills such as 'deep reading'. The argument goes that students no longer become absorbed by texts, but instead read two or three lines of an online text before switching to Facebook, or any of the other numerous tabs that are always open in their browsers, constantly competing for their attention (Carr 2008). With respect to MOOCs, Canavan (2013: 2 suggests that they 'will be extremely ineffective in teaching students, much less help[ing] them to become smarter readers and better writers'. The Senior Associate Dean for the Humanities and Arts at Stanford adds:

> Writing is one of the most important skills that people learn in the humanities, and, in my experience, it tends to happen by people going line by line over essays and giving detailed feedback … And that's unlikely to happen in a course that has 150,000 students. (Reichard 2013)

The SJSU professors stated:

> We do, of course, respect your [Sandel's] work in political philosophy; nevertheless, having our students read a variety of texts, perhaps including your own, is far superior to having them listen to your lectures. This is especially important for a digital generation that reads far too little. If we can do something as educators we would like to increase literacy, not decrease it. (SJSU Professors 2013).

They suggest that the new technologies may damage students' literacy. As Freedman (2013) puts it, learning is not always 'practical, manageable [and] bite-size (hence byte-size) … Real scholarship, criticism, or commentary is slow, detailed, and difficult, even in the hands of the clearest teacher or smoothest writer, and very few of us are those'. It is about 'getting to know a text, working through a problem, mastering a difficult philosophic chain of reasoning'. MOOCs are thus considered fundamentally incapable of providing a space in which students truly practise these kinds of skills that mark 'real scholarship'.

Having mapped the various objections made against MOOCs, we now turn to some experiences with a humanities MOOC, in order to see how far these objections are justified.

Digital *Bildung?*

In 2013, the *Los Angeles Review of Books* organized a two-part roundtable discussion in which four distinguished professors were brought together to speak about the risks and opportunities offered by MOOCs (Konstantinou 2013). The participants included Alan Filreis of the University of Pennsylvania and Ray Schroeder from the University of Springfield, Illinois, both of whom reflected

on several years of experience with online education, including recent experiments with MOOCs. In the second part of the roundtable, Cathy Davidson of Duke University, known for experimenting with online pedagogy, running what she referred to as a 'meta-MOOC' in 2014 on the 'History and future of (mostly) higher education', stated:

> I got it wrong in my original essay. When I said that we have some good methods for teaching problem-based learning online but haven't yet designed a MOOC format that serves dialogic thinking in the humanities and social sciences, I hadn't read about Professor Schroeder, in Springfield, Illinois, interacting with 'eduMOOC' students meeting around the wi-fi at the McDonald's in New Zealand. Nor had I read Professor Filreis's account of parents and grandparents taking his modern poetry class online alongside his Penn students—way back in the mid-1990s. I was so charmed after spending time noodling around the materials for his Coursera MOOC that I signed up to be a ModPo student myself this Fall. (Bogost et al. 2013)

ModPo, short for Modern and Contemporary American Poetry, is acknowledged as one of the first MOOCs in the humanities (Knox 2016) and started in 2012 with around 42,000 students (Bicher 2015). Courersa, the platform that currently hosts the course, describes it as:

> … a fast-paced introduction to modern and contemporary U.S. poetry, with an emphasis on experimental verse, from Emily Dickinson and Walt Whitman to the present. Participants (who need no prior experience with poetry) will learn how to read poems that are supposedly 'difficult'. (Coursera 2018)

ModPo runs for 10 weeks; however, the ModPo team tweets, blogs and supports forum discussions year-round. This period, referred to as 'SloPo', is considered just one of the reasons for the course's success (Perry 2017). In contrast to the critics' objections, the constant availability of course supervisors and moderators, as well as the community that is established and sustained through this year-round support, suggests that MOOCs are able to develop some form of community.

Live recordings of collaborative close readings, some led by Alan Filries, replace pre-recorded videos of lectures; however, everyone is encouraged to record and upload their own sessions in order to share and learn from others' experiences. Students are also invited to visit the centre should they ever be passing, with many both from the United States and further afield having made the pilgrimage. A number of teaching assistants (TAs) working with Professor Filreis on the course, as well as an additional international TA community (people who have taken the course several times before), support these sessions

(Brown 2015). Filreis has always stressed the community aspect of the course, whether that be online or offline. ModPo offers study and meet-up groups, active social forums and Google hangouts:

> We emphasize all the interactive spaces one can imagine: the discussion forums, in which I and the student TAs actively participate; weekly live webcasts; four ungraded, peer-reviewed essays; several Facebook groups, created by participants; a robust Twitter feed; various face-to-face meet-ups; 'office' hours in the forums; and a standing invitation for any ModPo'er who finds himself or herself in or near Philadelphia to visit me and the student TAs at the Writers House (many, indeed, have visited). (Bogost et al. 2013).

According to Filreis, the success of the course revolves around its focus on collaboration and interaction. He describes close reading as 'a social act' (Bicher 2015) and suggests that 'collaborative close readings involving thousands of people can produce fresh interpretations of open-ended poems' (Poetryfoundation 2014).

ModPo remains a free course with no prerequisites for admission. However, this does have repercussions in terms of enabling any measurable outcomes for the students. While the course does offer a certificate, it is one that 'is unique to ModPo', being that it is of their own design. The Coursera website states that:

> In order to receive the special ModPo certificate of completion, you must: 1) post a comment in at least one poem-specific discussion forum for each of ModPo's ten weekly sections; 2) write and submit all four writing assignments; 3) write and submit at least four peer reviews for each of the 4 assignments (at least 16 total); and 4) take and pass all quizzes (you can retake them until you pass).

Thus, while this course does appear to foster Socratic exchange, in that students are encouraged to question, provoke and discuss, both among themselves and with the moderators and supervisors who are constantly on hand, it is not really able to provide a fully graded or credentialed outcome for students. Some critics may consider this a shortcoming; however, Filreis maintains 'that the courses' objectives are more important than their measurable outcomes' (Bicher 2015). In addition to fostering exchange, ModPo also appears to enable the practice and development of both interpretive and communication-based skills, as participants need to learn to listen, engage and respond to one another in virtual forums, which offer different environments and opportunities from their usual day-to-day interactions. Filreis has thus stressed time and again that 'a humanities MOOC need not be impersonal' and that 'the reason ModPo has caught on is that people are discovering the mode of the course is exactly the point we are supposed to learn about the poetry' (Alenier 2012).

Convincing Coursera to facilitate his innovative pedagogical approach was not easy. In 2017, he explained to his university newspaper, *The Penn Gazette*, that he had to insist 'on the centrality of the discussion forums, which the founders of Coursera originally assumed would be places where you could ask questions like, "I don't understand Problem Two," not "What do you think the meaning of life is? Please reply"'. When it comes to the humanities and arts, Filreis adamantly believes in the importance of 'co-creation' or 'teacher–learner relationships that are iterative and circular'. What starts to become clear here is that, based on experiences like these, we can begin to cast doubt over any a priori incompatibility with the sort of intellectual virtues so valued by the humanities, or the sort of self-development inferred by the notion of *Bildung*. Filreis claims that:

> ModPo is not a textbook; it's a course, having about it the sense of a course: a collective movement through material, in which one learns the material with teachers and learners working at roughly the same time. The discussion forums are so lively that they are roughly synchronous experiences of community-based interpretations of the material. (Bogost et al. 2013).

Returning to our earlier definition of *Bildung* as dependent on a 'constant interplay between the individual and the community' or a 'dialogic relationship, in multiple forms, that is central to the self-formation of the individual', it certainly seems that ModPo is able to provide this. In the case of ModPo, the MOOC format actually appears to strengthen and bolster some of the values that the sceptics presume they threaten. If the glowing reviews and 95 per cent five-star rating the course continuously receives is anything to go by, it certainly seems that people are getting something out of it (Shah 2018; Coursera 2018). As one reviewer states, 'Once you sign up for ModPo, you are a ModPo'er for life … ModPo is more than just a class' (Pope 2015).

Similarly to Filreis, Schroeder also speaks of MOOCs sharing '[t]he social constructivist principles of what scholars of education call the "community of inquiry"' (Bogost et al. 2013). He claims that in his own experience this community is able to 'thrive online through teaching presence, social presence, and cognitive presence' convincingly contradicting the critics, he suggests, 'those are the very same principles that led to the success of the liberal arts college experience decades ago'(Bogost et al. 2013). Another example is Colgate University, a small, liberal arts college, which offers a MOOC via edX on 'the History of the Atom Bomb'. Despite some of the students involved acknowledging that the liberal arts and MOOCs are often considered 'unlikely bed-fellows' (Wadhera & Zengilowski 2015), their course enrols both current undergraduates and alumni of the College and thus serves to build a community, as well as to enhance on-campus courses (Brown 2015). These experiences suggest that experimentation with the humanities and MOOCs have offered a number

of new possibilities and opportunities neglected by their critics. What these experiments point to is that instead of instantly dismissing MOOCs, or constantly comparing them with traditional learning environments and dwelling on their shortcomings, looking for the new opportunities which they afford could be far more rewarding. The promises that accompanied the rise of MOOCs may have been exaggerated, but their continued popularity 10 years on indicates that they do fulfil a need. Courses like ModPo demonstrate that knee-jerk defences of the humanities in the face of new technologies might not be so warranted. Rather than looking to MOOCs as a revolutionary force that will transform higher education, perhaps MOOCs could be embraced as a way of fostering a quieter, slower form of disruption:

> By introducing professors to new tools and techniques that they could use to improve their on-campus teaching; by providing researchers access to a tremendous amount of data to improve teaching and learning; and by offering a level of international connectedness and shared meaning-making that, in its most utopic form, could lead to a new form of cosmopolitanism and global citizenship. (Brown 2015).

Despite criticism regarding how far they are truly 'massive' or 'open', formats like ModPo illustrate that there is something unique about MOOCs that make them a useful tool for experimenting with a 'new form of cosmopolitanism' (Brown 2015). Despite the concerns of many, if Filreis' experiences are anything to go by, it would seem that MOOCs are not a priori incompatible with courses in the humanities. Instead, they could, and perhaps should, provide a fertile playground for exploration and experimentation.

Conclusion: Would You Rather Be a Cyborg Mentor or a Socratic Master?[8]

Humanities scholars regularly mobilize objections to the deployment of technology in universities. Sometimes these are motivated by the ways in which economic imperatives are dominating choices made by universities, and sometimes by concerns for the quality of learning. In summary, the fear is that with MOOCs the 'factory' delivering packages of commodified knowledge to produce standardized degrees takes over from the vibrant and cosmopolitan interactions offered by the 'city'. In this chapter, we have demonstrated that the issues underscoring some of these criticisms are not particularly new, and thus not exclusively related to MOOCs. The current 'crisis' in the humanities is closely affiliated with a number of crises in higher education more broadly, which converged towards the end of the 1980s, giving rise to a 'great academic depression' (Kerr 2001). These crises concerned funding, access, enrolment and legitimacy (Hamilton 2016), and what Halffman and Radder (2015) describe

as the 'occupation' of the university by senior managers not committed to scientific and scholarly ideals. In the early 1990s, online education emerged as a potential panacea, which promised to resolve many of these issues, as well as to expand access to higher education. However, for its numerous critics, online education simply facilitated the introduction of numerous neoliberal reforms wherein the values of efficiency, productivity, cost-effectiveness and accountability were prioritized at the expense of traditional humanistic values, like meaning making, through interpretation and evaluation.

We have presented a more nuanced argument, going beyond the instinctive rejection of technology felt by many humanists. Haraway insisted 'the machine is us', and reminded us of our responsibilities for the creation, design and use of machines and technologies (1985: 99). Instead of seeing MOOCs as essentially anti-humanist, we recognize their potential for supporting *Bildung*. MOOCs are designed and used by people at particular historical moments, in specific university and disciplinary contexts, and they can take different forms and be used to support different pedagogical models.

As explained above, the first wave of MOOCs reflected a broad range of possibilities. Two distinctive models, cMOOCs, xMOOCs and various alternatives, offered numerous pathways for experimentation and development. In those early days, humanities courses enjoyed great success in both using and delivering humanities content via MOOCs. Some early examples, and some still ongoing, demonstrate that the humanities are not a priori incompatible with technology-intensive forms of mediated education. As MOOCs expanded, scepticism over what they were delivering increased and the popularity of humanities courses waned. As scepticism grew, MOOCs moved further away from the sorts of city-type models that enabled new pedagogical possibilities, and closer towards factory-style production lines. In a rather disturbing move, it could be that the voices of dissent we discussed above actually contributed to shaping the development of MOOCs in ways that are not conducive to *Bildung*. It is important to keep the specific educational concerns about MOOCs separate from broader debates about the long-standing crises in higher education. As Davidson suggests in Bogost et al. (2013), 'The deplorable condition of higher education today is a social problem that preceded, and is far greater than, the rise of MOOCs. Instead of MOOC panic, now is a time to be thinking collectively and responsibly about … the future of the university.' Issues surrounding funding, access, societal relevance and academic freedom cannot be attributed to MOOCs alone, but they are issues that urgently require discussion.[9]

Students remain interested in MOOCs, especially those who are unable for whatever reason to take part in the traditional place-based model of higher education. There may be variation from one year to the next, but the numbers from 2017 and 2018 indicate that enrolments in MOOCs are increasing at similar rates to 2012 and 2013. Even if completion rates are very low, many participants may take part for particular modules or out of curiosity rather than credit (Murray 2019). While they may not be the radically disruptive innovation

heralded in their early years, they are becoming a more constant feature of the higher education landscape. MOOCs have been pulled in a certain direction by market demand, while at the same time also being pushed away by outspoken criticism. It is likely that MOOCs will continue to play an important role in the future of higher education: it is therefore crucial that rather than shunning them entirely, humanities scholars need to deploy their critical energies and talents to engage and reflect upon what this might mean for their careers, disciplines and institutions.

Whether or not MOOCs will transform the meaning and practice of higher education in the future, there is little doubt that new technologies will continue to emerge, and they will be accompanied by promises and expectations, similar to those that accompanied other forms of distance learning. We know not only from MOOCs but also from countless studies of other technologies (digital and other) that values are deeply embedded in how technologies are designed and utilized. Deep analysis and reflection is needed regarding the epistemic and educational values prioritized by the producers and experienced by the users of MOOCs. Exploring the relationship between MOOCs and *Bildung* represents an opportunity for reflecting on what is lost and what is gained as humanities courses go digital.

The question is urgent. Online education has a role to play in expanding educational opportunities to a wide range of people, and the success or failure of particular innovations depends heavily upon the way in which professionals interpret and respond to them. The history of educational technology is one of divisive discourses. Humanistic values of *Bildung* are seen as incompatible with rationalist and instrumental values associated with technology (Hamilton 2016). To overcome such essentialist interpretations, it is crucial to approach online education not as something beyond or outside the human and the social, but as a sociotechnical practice. From this perspective, everyone, including those who promote, and those who protest, technological innovations within higher education have something to offer. Future research could investigate a reimagining of these critiques of educational technologies as a basis for their innovation. This reimagining could feed into institutional decision making as well as concrete technological developments in order to 'support a critical practice of online education in place of a critical reaction to technology' (Hamilton 2016: 161).

To conclude, we want to urge everyone (student, designer, policymaker, teacher) to adopt more nuanced understandings of digital or virtual spaces for teaching and learning which recognize that such spaces are not fixed, and that there is always potential for fruitful engagement and intervention. We introduce the word 'virtual' at this late stage to draw attention to what we already know from the philosophy and history of science, namely that the production of knowledge in whatever form is always embedded in and mediated by complex webs of social and material interaction (Wyatt et al. 2013). MOOCs have the potential to destabilize traditional power relations in the production and distribution of knowledge. This is in line with Berry (2011), who suggests that

the humanities have a responsibility to interrogate the affordances and implications of a technologically mediated 'digital intellect'. Humanities scholars need to look to the processes that technologies mediate. Instead of simply rejecting educational technologies like MOOCs, and dismissing them as tools incompatible with humanistic values, we need to recognize that they can be part of our pedagogical practices, and they may allow virtual knowledge spaces to open up and carry the potential for change (Wyatt et al. 2013). Of course, MOOCs may be taken up to strengthen an anti-humanist, profit-oriented model of education, and that will certainly be the case if the sceptics step back from engagement. Those committed to *Bildung* and those familiar with the technological possibilities need to work together in order to expand education in ways that are democratizing and empowering for both teachers and students.

Notes

[1] See the University of Edinburgh website for descriptions and reviews of the MOOCs they offer: http://eidyn.ppls.ed.ac.uk/article/introduction-philosophy-mooc-among-top-most-popular-mooc-all-time. Since this chapter was written, the University has also offered a MOOC in 'Intellectual Humility', which would be an even better example with respect to the argument made above.

[2] See Stanford's 'Purpose Learning' project where they look back from the year 2100, encouraging us to 'take a peek into archival footage brought from the future to discover how the learning paths were transformed by Purpose Learning': http://www.stanford2025.com/purpose-learning/

[3] Edsurge publishes independent news and reports. The growth and development of MOOCs within the landscape of higher education has been a regular feature on their site in recent years: https://www.edsurge.com/news/2014-12-26-moocs-in-2014-breaking-down-the-numbers

[4] See here for an overview of the BBC's Royal charter: https://www.bbc.com/aboutthebbc/governance/mission

[5] A number of well-argued and reflexive accounts stress the humanities' value in multiple ways, from facilitating democracy to increasing happiness (Bate 2010; Nussbaum 2012; Small 2013).

[6] *The Stanford Daily* published on the difficulties encountered in teaching the humanities via MOOCs here: http://www.stanforddaily.com/2013/06/04/moocs-face-challenges-in-teaching-humanities/

[7] According to virtue epistemologists, we cannot only be told to be open-minded, we must undergo a shift whereby open-mindedness becomes 'deeply inculcated'. We cannot only believe that being open-minded is a positive thing, we must have virtuous desires and motivations which mean that we become fundamentally attached to the practice of being open-minded (Montmarquet in Battaly 2006: 204). According to Zagzebski, this will 'begin with the imitation of virtuous persons, require practise

which develops certain bits of feeling and acting, and usually include an in-between stage of intellectual self-control' (Zazebski in Battaly 2006: 204).

[8] With apologies to Donna Haraway, who, in *The cyborg manifesto*, stated that she 'would rather be a cyborg than a goddess' (1985: 101).

[9] In recent years, there have been protests about the state of higher education in various countries, sometimes prompted by budget cuts, departmental (usually humanities) closures, work pressure, privatizing pensions or something else. An overview can be found in Halffman and Radder (2015; 2017).

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AFTERWORD

Critical Philosophy of Technological Convergence

Education and the Nano-Bio-Info-Cogno Paradigm

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The fateful question for the human species seems to me to be whether and to what extent their cultural development will succeed in mastering the disturbance of their communal life by the human instinct of aggression and self-destruction.

Sigmund Freud, *Civilization and its discontents*, trans. James Strachey[1]

… the relationships between the biological body and information technology is such that the body may be approached through the lens of information … is therefore subject to the same set of technical actions and regulations as is all information. In short, when the body is considered as essentially information, this opens onto the possibility that the body may also be programmed and reprogrammed.

Eugene Thacker[2]

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Fifth-Generation Mobile Cellular Technology and Techno-Nationalism

In *Civilization and its discontents* (1930), Freud explores the fundamental tension between the individual's instinct for freedom and civilization's demand for conformity. Matteo Stocchetti, the editor, draws a parallel between *The digital age and its discontents* and Freud's work, as 'an inquiry into the downsides of digitalization and the re-organization of the social world'. The ethos of the book differs in that contributors 'seek to conceive and construct alternative possibilities' based on the role of education. Stocchetti embraces critical social science as the means to mount a critical appraisal of societal digitalization and 'the ideological appropriation of technological development' by capitalism and its effects on the formation of education in the digital age. This is a massive question, but one that is urgent as the West and China fight over 5G as the next-generation standard for cellular wireless communications that promise a huge increase in data and its transmission with greater device connectivity. This fight is a symptom of the larger picture concerning 'the path to digital modernity' and whether and to what extent it will be neoliberal capitalism or 'socialism with Chinese characteristics'. These are both forms of enveloping global digital communication systems and both capitalist. It is not clear at this point whether the global systems will diverge or converge, but the effects of the bifurcation of the world system will be felt for the next decade and between them they will help to determine the next generation of applications not only in industry, but also in the social portfolios of health, education, welfare and based on greater connectivity and the harnessing of big data.

Digital cellular networks of 5G (10 Gbit/s) are 100 times faster than previous networks, with much faster response times and the capacity to transmit multiple bits of information simultaneously. The 5G technology will open up new applications of virtual reality and augmented reality, with the advantage of fast machine-to-machine continuous communication in the Internet of Things. The technology is well advanced and Korea has already demonstrated 5G, with other countries in the process of testing and adopting it. The discourse of tech talk suggests 5G will usher in 'the next wave of technology'. Worldwide, it will be dominated by a small group of companies, including Huawei, Intel and Qualcomm, as well as Cisco, Ericsson, Nokia, Samsung and ZTE for provision of infrastructure. The technology is expected to be rolled out in 2020 and take a decade to install, involving trillions of dollars. The stakes are high, as Paul Triolo and Kevin Allison of Eurasia Group's white paper, *The geopolitics of 5G*, indicate:

> [The report] explains how political forces, including the ongoing technology and trade confrontation between the US and China, will shape the development of next-generation mobile standards, spectrum allocation, and deployment in key markets and regions. It likewise addresses how 5G's development will shape economic, technological, and

> geopolitical competition between the world's leading technology superpowers. (Eurasia 2018: 3)

The key findings of the report focus on China's 'first-mover advantage' in 5G and the US efforts to exclude Chinese networking equipment suppliers from Western networks, with the prospect of 'a bifurcated 5G ecosystem' with 'politically divided and potentially non-interoperable technology spheres of influence'. 5G is seen as a *foundational* transformational technology because it enables many other applications of the 'next wave'. It will build the technology ecosystem within which other technologies can converge and set up new syntheses. It seems that already at this stage the 5G networks will enable new digital applications that require 'ultra-fast, low latency, high-throughput communications, including driverless cars, advanced factory automation, and smart cities' (Eurasia 2018: 5). As the report makes clear: 'These applications will be the biggest source of long-term economic and political advantage from 5G, and they will be the subject of intense competition between leading US and Chinese companies' (ibid.). At the same time, China's 'Belt and Road Initiative' also promises a related geopolitical advantage in Africa, Latin America and the Middle East, although it is also clear with the example of Italy that European countries will be involved in making risky trade-off political decisions for Europe and for European relations with the United States.

5G will be largely 'cloud native'—industry jargon for relying on AI software that are said to pose unique security concerns. In particular:

> The huge growth in the number of connected devices and large bandwidths means that the potential for unsecure or compromised devices to be used for malicious activity such as botnet-driven denial of service attacks goes way up, as does their size and severity. (Eurasia 2018: 8)

This risk is heightened by the fact that '[a]s the number of connected devices and the amount of data explode, a greater share of total global economic output will come to rely on global data networks' (ibid.).

Why should I dwell on this contemporary example in a book that addresses the discontents of the digital era and the role of education? Partly because, as Stocchetti informs us, 'the main task is to examine the role of technological innovation in relation to the nature and direction of social change associated with different interpretations of this role, and with the role of formal education' (Chapter 1 in this volume). In my view, critical social science needs to be sufficiently well informed about current developments or tied to what is happening now. How often have we heard the notion of the next 'technological wave': but in terms of Kandratiev waves it is useful to entertain the concepts of *foundational*, *transformational*, *emergent* and *convergent* (local and general) technologies. These concepts help us to distinguish the building of the technological ecosystem from its internal operations. I think it is useful also to work from

a bottom-up view to analyse 'discontents'. There are a number of implications I wish to draw from the 5G example and the methodological or philosophical aspects is but one of them. So, first, the interrogation of the role of technological innovation, especially in relation to the role of public education, demands an understanding of the successive waves of new platform technologies, emergent technologies and convergent technology.Second, a strange paradox perhaps, while education is a fundamental institution, it is a 'key arena or place of struggle between competing visions of the future of society' only after installation—at least in relation to 5G networks, not in a primary sense as a global institution that will affect outcomes, but, perhaps, only in a secondary sense concerning use, after the technology has been rolled out. Undoubtedly, education will be affected by 5G: it will be reshaped, certain incipient developments already on the way will receive increased use, speed and application—personalization, Internet research, academic publishing, increased speed of communication, virtual reality education, augmented intelligence and so on. The struggle will not be over whether or not 5G will be introduced, but, if anything, it will be over its uses and whether these support existing neoliberal policies of privatization or, by contrast, the symbolic production of global public goods and public good science in open platforms.

Third, the discourse of 'modernity' and 'Enlightenment' is not far away from the technical discussions of specs and uses. Indeed, it is to the forefront of both an emerging bifurcation of techno-world systems—Chinese or American. The Nineteenth Congress of the Communist Party of China (CPC) makes it crystal clear that China and the CPC now enter world history as a global power that advocates a path of modernity that is based on 'socialism with Chinese characteristics', where the White House and US trade representatives, realizing that in certain critical areas of technology, China has stolen a march on them that threatens the neoliberal world ascendancy of Silicon Valley, are kicking up at trade talks so as to slow China's advantage. Trump is even talking of great US state control and direction to match China's state capitalism and to provide greater steering capacity.

China has made incredible progress from the old days of copy strategies to support and develop a world-class indigenous technology sector that will propel China into the leading world position in high-tech industries in a few years, threatening the US Silicon Valley leading position in new digital technologies, and competing successfully in world biotech, nano-tech, new materials and energy technology markets. As Lorand Laskai (2018) comments: 'In the saga of the U.S.-China economic rivalry, *Made in China 2025* is shaping up to be the central villain, the real existential threat to U.S. technological leadership.' He notes also that Chinese planners have studied and learned from Germany's 'Industry 4.0'[3] based on adoption of intelligent systems and full automation in manufacturing that is commonly seen as the basis for the Fourth Industrial Revolution clustered around converging technologies[4] encouraging 'the global artificial intelligence race'.[5] The report does not mention deep machine and

quantum computing, in which China has made large investments earlier than the United States and other countries.[6]

The tables have turned in the era of monopoly digital capitalism when the field is dominated by (soon-to-be) trillion-dollar multinationals that seemingly can do what they like outside national tax laws. The big five—Amazon, Apple, Facebook, Microsoft, Google—defining a new historical stage of capitalism, are matched by the growth of Chinese Internet companies, Alibaba, Baidu, Tencent, JD.com and NetEase. There are already fears that the US 'big five' could destroy the 'Tech Ecosystem'. They will not only dominate the foreseeable future, but will also operate more like governments. There is also the new concept of 'techno-nationalism', which is now used with increasing frequency to describe the threat of China. Thus, Amol Rajan (2018) writes:

> One of the most important stories in the world right now is the battle to own the future by investing in technology, in which non-democratic states are becoming more assertive, strategically effective and—unencumbered by voters' preferences—able to think in epochal rather than electoral cycles … Techno-nationalism marries two trends that are central to our current historical moment. First, the remarkable acquisition of power through data and 'network effects' of just a few companies based mainly near San Francisco, and the escalating battle between these companies and Chinese rivals. And second, the decline of the post-1945 Western-led world order.

These fears of the emergence of the Chinese techno-state now worry Washington, which is abuzz with Chinese 'techno-nationalism' and the prospect of when China rules the web as the techno-service state. In another example, Adam Segal (2018) writes:

> In Xi's words, cyber-sovereignty represents 'the right of individual countries to independently choose their own path of cyber development, model of cyber regulation and Internet public policies, and participate in international cyberspace governance on an equal footing.' Three technologies will matter most for China's ability to shape the future of cyberspace: semiconductors, quantum computing, and artificial intelligence.

One significant theoretical question is which economic system will be more successful? Neoliberal America or Socialist China? Free capitalist America or State Socialist (capitalist) China? Are these even real alternatives? The global techno-ecosystem may be constrained by techno-nationalism, but it may also be enhanced through global market penetration. This is partly a question of international law in telecommunications and architecture of the Internet that is yet to be written. One thing for sure is that the trade wars initiated by Trump are in large measure spooked by fears of China's coming dominance in

the technological era of the future development. This fear and the eclipse of American technological dominance is one of the real sources of Trump's trade war with China.

5G is *only* fifth generation, yet we already experience the birth of digital convergence where the same multimedia content is ubiquitous and available to view on different types of devices where information is intermingled, sent, published and stored with the same efficiency without being downgraded. This digital convergence is one of the factors making technological convergence possible.[7]

'Convergent Technologies' and the 'Nano-Bio-Info-Cogno' Paradigm

The notion of so-called 'convergent technologies' and the 'nano-bio-info-cogno' (NBIC) paradigm has dominated the US National Science Foundation (NSF) for over a decade. The vision is still current. These technologies are not restricted to new digital technologies, but embrace a set of converging technologies, including the following:

- *Nano*: the branch of technology that deals with dimensions and tolerances of less than 100 nanometers, especially the manipulation of individual atoms and molecules.
- *Bio*: the exploitation of biological processes for industrial and other purposes, especially the genetic manipulation of micro-organisms for the production of antibiotics, hormones, etc.
- *Info*: information technologies based on the paradigm of quantum computing.
- *Cogno*: convergence of nano, bio and IT for remote brain sensing and mind control.

These are 'convergent technologies' purported to drive the next stage of the knowledge society as a 'paradigm for the future' which has clear implications for education in the intermediate term, with some disturbing convergences that harness info, bio and nano-technologies in relation to cognitive science.

The National Science Foundation (NSF) has published reports exploring the convergence of the 'NBIC technologies', including the chief application areas: expanding human cognition and communication; improving human health and physical capabilities; enhancing group and societal outcomes; strengthening national security; and unifying science and education. The claim advanced by NSF is that there is a new scientific 'unity at the nanoscale' (Bainbridge & Roco 2006). There were three important sources that guided subsequent discourse: first, the foundational report sponsored by the NSF and the Department of Commerce (DOC), entitled *Converging technologies for improving human performance* (2002); second, the 2004 report of the Science and Technology Foresight Unit of the European Union, entitled *Converging*

technologies—shaping the future of European societies (Nordmann 2004); third, a report entitled *The big down: from genomes to atoms* (ETC Group 2003). The notion of 'convergent technologies'—the *great convergence*—has guided NFS for over a decade and seems to have been recognized and adopted by European Science, and to be attracting much commentary from scholars around the world.

Nanotechnology, biotechnology, information technology (IT) and new technologies based in cognitive science signify an emerging harmony among the sciences. NBIC unification means NBIC fields are progressively merging, step by step, at an accelerating rate: '[The global convergence] will constitute a major phase change in the nature of science and technology, with the greatest possible implications for the economy, society, education and culture' (Roco & Bainbridge 2002: 1). A brief look at nanoscience and nanotechnology reveals: 'Recent advances in nanoscience and nanotechnology enable a rapid convergence of other sciences and technologies for the first time in human history' (Bainbridge and Roco 2005: 2–3) Biotechnology and biomedicine are taking place at the nanoscale—for example, genetic engineering (with DNA molecules), imaging (with quantum dots of a few nanometres), targeted drugs (with nanoparticles as carriers) and biocompatible prosthesis (with molecules 'by design').

Modern IT is based on microelectronics, which is rapidly evolving into nanoelectronics. Of the four NBIC fields, 'cognitive science is the least mature, but for this very reason, it holds very great promise. multidisciplinary convergence of cognitive, psychology, linguistics, cultural anthropology, neuroscience, and artificial intelligence with aspects of computer science' (Roco & Bainbridge 2002: 1). This is a significant staging point of convergence: nano-bio-info technologies have made huge progress, beyond expectations, and the next stage is the application, integration and convergence with cognitive science. Here's the expected pay-off for education. We are waiting for the next round of convergence and the breakthroughs for a cognitive science model of education.

Roco and Bainbridge (2002: 1) comment on an early statement of the 'converging technologies' theme:

> We stand at the threshold of a new renaissance in science and technology, based on a comprehensive understanding of the structure and behavior of matter from the nanoscale up to the most complex system yet discovered, the human brain. Unification of science based on unity in nature and its holistic investigation will lead to technological convergence and a more efficient societal structure for reaching human goals. In the early decades of the twenty-first century, concentrated effort can bring together nanotechnology, biotechnology, information technology, and new technologies based in cognitive science.

The document also addressed the prospect of unifying science from the nanoscale and integrative principles; cognitive, civic and ethical changes in a

networked society; breadth, depth, 'trading zones' and reshaping education at all levels; and changing the human culture.

Five years later, Bainbridge and Roco talk of 'Progressive Convergence':

> Technological convergence is progressive in two important senses of the term. First, the NBIC fields are in fact progressively merging, step by step, and apparently at an accelerating rate. Second, the unification of the great realms of technology will promote human progress, if they are applied creatively to problems of great human need. (2006: 2)

As Roco and Bainbridge (2013) indicate, convergence of knowledge and technology for the benefit of society (CKTS) is the core opportunity for progress in the 21st century, based on five principles:

> (1) the interdependence of all components of nature and society; (2) decision analysis for research and development based on system-logic deduction; (2) enhancement of creativity and innovation through evolutionary processes of convergence that combine existing principles, and divergence that generates new ones; (4) the utility of higher-level cross-domain languages to generate new solutions and support transfer of new knowledge; and (5) vision-inspired basic research embodied in grand challenges (Roco and Bainbridge 2013: 1).

Gro*w*ing convergence research at the NSF was identified in 2016 as one of 10 'big ideas' for future NSF investments:

> Convergence research is a means of solving vexing research problems, in particular, complex problems focusing on societal needs. It entails integrating knowledge, methods, and expertise from different disciplines and forming novel frameworks to catalyze scientific discovery and innovation. Convergence research is related to other forms of research that span disciplines—*transdisciplinarity, interdisciplinarity, and multidisciplinarity*. It is the closest to transdisciplinary research which was historically viewed as the pinnacle of evolutionary integration across disciplines. (NSF, Emphasis in the original)[8]

On 23 March 2018, the NFS issued another letter (DCL) on the *Growing convergence research at the National Science Foundation (NSF)*, based on research driven by a specific and compelling problem and deep integration across the disciplines:

> Proposals must reflect the characteristics of convergence outlined (and abridged) as:

> 1. A convergence project should make a compelling argument for why it is essential to bring together substantially different science and engineering disciplines to address a specific scientific challenge or social problem. The extent of disciplinary diversity may be assessed by the history of intellectual traditions; the development of different tools, techniques, and approaches; and the various venues for publication.
>
> 2. In order to make significant progress, the research team would need to provide evidence of readiness to engage in the proposed convergence research while simultaneously also representing different disciplines.
>
> 3. A convergence project should make a compelling case for the depth of integration of knowledge bases in the contributing disciplines; it should demonstrate strong coupling, high leveraging, and/or co-development of integrated and/or beneficially complementary tools and techniques from the contributing disciplines; and it should demonstrate novelty of the integrated research approach resulting from combinations of modes of thinking that are characteristic to the contributing disciplines.
>
> 4. Convergence projects are encouraged to provide new learning and experiences to undergraduate students, graduate students, and/or postdocs that would help prepare them to become the next generation of convergence researchers What roles will they play in learning to use new tools, instruments, and techniques that are central to convergence research? What concepts will they need to learn outside of their own disciplinary specialties, and how? Will the project provide new model learning environments that can be adapted in other convergence research projects?[9]

We are reminded that the 'great convergence' driving the NSF research programme should 'not be mistaken for the mundane growth of interdisciplinary or multidisciplinary fields' (Bainbridge & Roco 2005: 2).

We are told that NBIC convergence requires, and is made possible by, the radically new capabilities to understand and manipulate matter that are associated with nanoscience and nanotechnology. Not only do many of the key structures of the human nervous system exist at nanoscale, but that nanotechnology is enabling a convergence of other sciences and technologies for the first time in human history, including in the field of cognitive science, with an emphasis on education and the learning sciences combining advances in neuroscience and artificial intelligence, and connecting education and learning to biology (brain science) and information science.

This ethos and emphasis is prioritized at the national level through the NSF establishment of National Learning Centers (NLC). The 'cogno' convergence

with other elements of the paradigm is the least developed and the 'miracle-to-come' that promises the completion of the network platform that manages the nano-bio-info flows and self-circuitry. It is the focus that heralds a new *cognitive efficiency*, in part captured by 'intelligent technologies' of the Internet, Facebook, Google and the new wearables. The question is: Are there downsides? What are the discontents? The Institute of Medicine and National Research Council in 'Advances in technologies with relevance to biology: the future landscape", chapter 3 of *Globalization, biosecurity, and the future of the life sciences* (National Academies, 2006), begin a conclusion with the following quote from Matthew Meselson that bears some resemblance to Freud's quote with which I open this chapter:

> During the century just begun, as our ability to modify fundamental life processes continues its rapid advance, we will be able not only to devise additional ways to destroy life but will also be able to manipulate it—including the processes of cognition, development, reproduction, and inheritance (National Academies 2006:197)

The review that covers, among other topics, Computational Biology and Bioinformatics, Systems Biology, Genomic Medicine and Nanotechnology, remarks:

> An intriguing feature of the nanoscale is that it is the scale on which biological *systems build their structural components, l*ike microtubules, microfilaments, and chromatin. In other words, biochemistry is a nanoscale phenomenon. Even more intriguingly, a key property of these biological structural components—including, of course, the DNA double helix—is self-assembly. (National Academies 2006: 185–186).

We might say the nano-self has arrived and employ a Foucauldian riff on 'bio-politics' to argue that research biological knowledge and information science now treats the population as a living mass to be made cognitively efficient in the chain of the NBIC paradigm, disrupting our bodily identities and diminishing our control over our subjectivities in the name of optimizing national cognitive advantage. We now live in a global economy where nanotechnology, biotechnology, IT and cognitive sciences are converging into new capitalistic strategies or 'advanced capitalism', which aims to accumulate profits by investing in the 'commodification of all that lives' (Braidotti 2013: 59). By contrast, I call this 'bio-informational capitalism' (Peters 2012) to highlight the twin forces that between them shape humanity's destiny and also talk of 'algorithmic capitalism in the age of digital reason' (Peters 2017) as a means of mapping a resurgent fifth-generation cybernetic capitalism that led and profited from financialization and high frequency trading[10] (Peters et al. 2015).

National Learning Centers established by the NSF[11]

CELEST—The Center of Excellence for Learning in Education, Science, and Technology

https://www.brains-minds-media.org/archive/153/index_html/?searchterm=CELEST

CELEST began on October 1, 2004. Funded by a five-year $20,000,000 grant by the National Science Foundation of the USA, this new Center brings together leading scientists, educators, and technologists from Boston University, Brandeis University, Massachusetts Institute of Technology, and the University of Pennsylvania to study autonomous real-time learning systems by integrating experimental and computational brain science, biologically inspired technology, and classroom innovation.

LIFE—The LIFE Center

http://life-slc.org/about/about.html

The LIFE Center represents a collaboration between the University of Washington in Seattle, Stanford University, and SRI International, Inc., both in the San Francisco area. The LIFE Center is a multi-institution Science of Learning Center funded by the National Science Foundation. The University of Washington is the lead institution. Other institutions across the country also participate. LIFE Center researchers represent a broad range of fields, including neurobiology, psychology, education, speech and hearing sciences, anthropology, and sociology, and many of the issues LIFE investigates arise from their interactions. The … purpose is to develop and test principles regarding the social foundations of learning … investigators focus on complex human learning over the lifespan with the goal of understanding how and why human social processes affect learning. LIFE Center findings will inform learning theories, influence educational practices, and affect technologies designed to enhance learning.

PSLC—Pittsburgh Science of Learning Center

Learning Sciences and Technologies https://hcii.cmu.edu/research/pittsburgh-science-learning-center

https://learnlab.org/

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The Pittsburgh Science of Learning Center is leveraging computational theory and cognitive modeling to identify the instructional conditions that cause robust student learning. PSLC has created the Learnlab facility designed to dramatically increase the ease and speed with which learning researchers can create the rigorous, course-based experiments that pave the way to an understanding of robust learning. The Center is cross-organized by four research thrusts (Cognitive Factors, Metacognition and Motivation, Social Communicative Factors, Computational Modeling and Data Mining) and six LearnLab courses (Algebra, Geometry, Chemistry, Physics, Chinese, and English as a Second Language).

SILC—Spatial Intelligence and Learning Center

https://www.silc.northwestern.edu/

The Spatial Intelligence and Learning Center (SILC) brings together scientists and educators from many different institutions to pursue the overarching goals of understanding spatial learning and using this knowledge to develop programs and technologies that will transform educational practice, helping learners to develop the skills required to compete in a global economy. SILC participants include researchers from cognitive science, psychology, computer science, education, and neuroscience, as well as practicing geoscientists and engineers who are particularly interested in spatial thinking in their fields, and teachers in the CPS.

TDLC—Temporal Dynamics of Learning Center

https://tdlc.ucsd.edu/tdlc2/index.php

The Temporal Dynamics of Learning Center or 'TDLC' is a National Science Foundation-funded Science of Learning Center that has enjoyed over a decade of success. TDLC aims to achieve an integrated understanding of the role of time and timing in learning, across multiple scales, brain systems, and social systems. The scientific goal of the center has been to understand how the element of time and timing is critical for learning, and to apply this understanding to improve educational practice.

Visual Language and Visual Learning

Washington DC, United States – https://www.gallaudet.edu/news/vl2-nsf-meeting

Visual Language and Visual Learning (VL2) is a Science of Learning Center (SLC) on Visual Language and Visual Learning, one of six SLCs funded by the National Science Foundation. The purpose of VL2 is

to gain a greater understanding of the biological, cognitive, linguistic, sociocultural, and pedagogical conditions that influence the acquisition of language and knowledge through the visual modality.

'Now Is the Winter of Our Discontent'

In *Re-becoming human*, Heidi J. Boisvert asks: 'How did we get to a point where we so easily render our biological control and knowledge to technical affordances? Which mechanisms have been conducive to "self-amputation"?' (2015: 3, emphasis in the original). 'Self-amputation' is the term McLuhan uses for the media numbing of the biological self. Boisvert claims, 'the post-biological technocracy to which we are unconsciously ceding control of our cognitive and affective faculties … also explores how embodied, bio-adaptive game-based networked performance practices can serve as an antidote, restoring critical feeling' (ibid.: xi). She wonders: 'Can taking up the same intelligent technology in the service of aesthetics resist amputation, maintain autonomy and restore critical feeling to create more balance between the biological and technological self?' (ibid.: 3).

Her argument is that 'intelligent technology is a slow form of violence re-scripting the nervous system, which in turn affects physical well-being, interpersonal relationships, and by extension, the fabric of society' (ibid.: 6). I will not comment on her 'aesthetics of critical feeling', although it certainly seems to offer one 'post-industrial therapy'. In making this claim, she reviews the work of Hayles, Turkle and Damasio and clinical evidence to investigate how the dependence upon intelligent technology (IT) is changing the brain-wiring diagram and re-scripting nervous systems and the ways in which intelligent technology is numbing the biological self. In this project, it is not her intention to condemn intelligent technology, but 'to problematize it as an ambivalent artifact situated within an ecology of effects—social, cultural, neurological and biological' (ibid.: 10). Boisvert wants to offer a more balanced alternative to the emphasis on the new fifth-generation cybernetics that rules Google, Amazon and Facebook through what she calls 'ludic performance'. What concerns me here is her analysis that is well expressed rather than the alternative she proposes:

> Our dependence upon the Internet and mobile devices, and our increasing fascination with wearables and immersive displays, the latest self-extensions, appear to further amputate rather than augment the cognitive and affective faculties, such as reason, perception, memory and emotion. Current intelligent technologies, such as those listed above, are not only dissolving our knowledge schemas and rendering us emotionally void but also re-wiring our neurons to prefer technology to actual human engagement. (ibid.: 20)

The terms of her nalysis are set out in the section entitled 'Perennial conflict between autonomous technology & human agency' and she investigates 'Epistemic shifts & the six waves of technological innovation' in the subsequent section, following Schumpeter and Smilhula's (2010) 'Waves of technological innovation and the end of the information revolution', focusing on the hypothetical wave of the post-informational technological revolution. She explores the legacy of cybernetics in terms of 'the erasure of the body', 'the regulation of emotions' and the 'canalization of the senses', finally to examine the 'socio-cultural and neurobiological impacts of intelligent technology'. Against the utopian technical immortalists—Ray Kurzweil, Martine Rosenblatt, Aubrey De Grey, Kevin Kelly, Sergei Brin and Jason Silva—she claims we are being robbed of our autonomy; that we are becoming less human as we are integrated into the circuitry of fifth-generation resurgent capitalist cybernetic systems. The argument has a narrative complexity that propels itself harnessing the theories and studies in critical social science and demands attention, if even only as a programme of Popperian falsification in the NSF community.

The development of the adolescent's brain in a technological world constitutes a societal anxiety that ought to take priority in a research culture that focuses on cognitive efficiency.[12] Mary Helen Immordino-Yang suggests that the constant use of technology is hijacking one's ability to form high-level meaning within one's environment, putting the emphasis on the way in which we use technology to set expectations and receive validation as where issues can arise. Are we to believe, with Nicolas Carr (2010), that the Internet is rerouting the neurological pathways of our brains? To what extent is this a research question of the NFS learning centers? Is there room to entertain the counter-factual, the counter-hypothesis, the counter-theory, or are we condemned to accept the 'truths' generated by the consensus of an enthusiastic pro-tech community? To what extent are these alleged neurological effects impacts of a broader long-term tendency of a resurgent cybernetic capitalism now dominated by the soon-to-be trillion-dollar information service of US multinationals who ideologically embrace a higher moral purpose?

The clinical studies are in their early stages. While computers clearly help with the development of some cognitive skills, they also demonstrate negative impacts on verbal and social skills and curtailment of 'deep thinking', sometimes promoting anti-social behaviour and forms of technological addiction. The studies have mixed results. The effects of digital screen media are better known than interactive media (Anderson & Subrahmanyam 2017). These are complex questions that contain many variables and are not easily resolvable into grand conclusions and are unable to be effectively reviewed here.[13] Pamela Hurst-Della Pietra (2017) mentions 'Internet gaming disorder' which, as she reports, was defined in the DSM IV by the American Psychiatric Association (2013) as 'persistent and recurring use of the Internet to engage in games, often with other players, leading to clinically significant impairment or distress'.

The larger question of political economy aims to investigate the 'post-information' or 'post-digital' wave divides the community of scholars into those who

talk of its inevitability in visionary and moral terms and those in the critical tradition of social science who, by contrast, emphasize digital discontents. The bifurcation of Chinese and American techno-systems is at an early stage and it is difficult to predict divergence or convergence. Given that we are *only* in the fifth generation, edging into the sixth wave (if you accept this depiction), it is crucial that we set up research programmes which, against the tide of expectations, can raise questions of negative and detrimental impacts and 'discontents', and engineer larger questions—social, political and ethical—about emergent system effects in their entirety.

Notes

[1] Available at https://www.stephenhicks.org/wp-content/uploads/2015/10/FreudS-CIVILIZATION-AND-ITS-DISCONTENTS-text-final.pdf

[2] E. Thacker, Data made flesh: biotechnology and the discourse of the posthuman. (2003) *Cultural Critique, 53*(winter), Special issue: Posthumanism, 86.

[3] See https://www.plattform-i40.de/I40/Navigation/DE/Home/home.html

[4] See https://www.mckinsey.com/featured-insights/china/a-digital-upgrade-for-chinese-manufacturing

[5] See https://www.cfr.org/event/global-artificial-intelligence-race

[6] See http://www.chinadaily.com.cn/business/2017top10/2017-05/16/content_29359368.htm

[7] See the Technology Convergence Conference (http://teladatatcc.com/) and the International Conference for Convergence in Technology (https://www.ieee.org/content/ieee-org/en/error/404.html/).

[8] See https://www.nsf.gov/pubs/2018/nsf18058/nsf18058.jsp?WT.mc_id=USNSF_25&WT.mc_ev=click

[9] See https://www.nsf.gov/news/special_reports/big_ideas/convergent.jsp

[10] See http://www.uta.edu/huma/agger/fastcapitalism/14_1/Peters-Algorithmic-Capitalism-Epoch.htm

[11] All information is taken from the NLCs' websites.

[12] See https://www.youtube.com/watch?v=rq8P-25ybcc

[13] See Pamela Hurst-Della Pietra's 'Introduction' to an issue of *Pediatrics (2017) that includes articles, for example, by James et al. (2017) on* 'Digital life and youth well-being, social connectedness, empathy, and narcissism,' *Hoge et al. (2017) on* 'Digital media, anxiety, and depression in children' and Gentile et al. (2017) on 'Internet gaming disorder in children and adolescents', with other researchers investigating social effects of media and media content.

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Three decades into the 'digital age', the promises of emancipation of the digital 'revolution' in education are still unfulfilled. Furthermore, digitalization seems to generate new and unexpected challenges – for example, the unwarranted influence of digital monopolies, the radicalization of political communication, and the facilitation of mass surveillance, to name a few.

This volume is a study of the downsides of digitalization and the re-organization of the social world that seems to be associated with it. In a critical perspective, technological development is not a natural but a social process: not autonomous from but very much dependent upon the interplay of forces and institutions in society. While influential forces seek to establish the idea that the practices of formal education should conform to technological change, here we support the view that education can challenge the capitalist appropriation of digital technology and, therefore, the nature and direction of change associated with it.

This volume offers its readers intellectual prerequisites for critical engagement. It addresses themes such as Facebook's response to its democratic discontents, the pedagogical implications of algorithmic knowledge and quantified self, as well as the impact of digitalization on academic profession. Finally, the book offers some elements to develop a vision of the role of education: what should be done in education to address the concerns that new communication technologies seem to pose more risks than opportunities for freedom and democracy.

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