CHAPTER 1

Introduction

Technology, Society and Education

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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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