

Technology and Self-modification: Understanding Technologies of the Self After Foucault

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ABSTRACT

Self-modification is an ancient human practice; however, for the first time in history, technology is enabling us to modify our lives not only at an existential or experiential level, but also at an informational level. This paper discusses Foucault's concept of "technologies of the self" as well as some of its recent interpretations within contemporary philosophy of technology. It shows how ICTs have opened new dimensions for humans to transform their bodies, minds, and self-conception. It argues that while 'traditional' self-modification is being revolutionised and popularised by ICTs, these systems are also exposing us to potent, and unintentional forms of ontological tinkering. Ultimately, this paper shows how Foucault's concept can serve as a valuable tool for understanding contemporary human-technology relations.

KEYWORDS

Human-technology relations; ICT; information; philosophy of technology; postphenomenology; self-identity.

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1 | INTRODUCTION

The impact of current technological changes over human self-understanding has come to the fore in recent years, particularly given our ever-increasing interaction with virtual worlds, new forms of biotechnology, and the potential emergence of strong artificial intelligence (AI). Information and Communication Technologies (ICTs) are already altering the contexts and practices through which people—particularly the young—shape their personal identities, and hence, the ways they relate to their groups, societies, cultures, and environments (Floridi, 2011a; 2014). Yet, as radical as these changes are, artificial self-modification is by no means a new phenomenon, since humans have been doing it for millennia. What the ongoing technological shifts are transforming is the availability, range of action, and power of our self-modification tools. In so doing, they are making evident that human practices and technologies have *always* formed complex sociotechnical systems and, therefore, that a clear distinction between 'natural' and 'artificial' phenomena in human contexts is, at best, illusory. However, whereas these notions are by now generally accepted throughout new branches of philosophy, science, and engineering, they have only recently begun to permeate art scholarship. Here, the aforementioned natural vs. artificial distinction along with the subject vs. object dichotomy continues to exert a strong influence in how scholars (and some

creative practitioners) think about human-technology relations. Dispelling the idea that technological systems and human beings can somehow be analysed independently from each other is a crucial step towards developing a much-needed contemporary humanistic critique of how technologies are shaping our sense of self.

Human self-modification tends to be portrayed—particularly within transhumanist literature (e.g. see More & Vita-More, 2013)—as a relatively novel phenomenon that emerged as a consequence of the ongoing information revolution. Conversely, posthumanist accounts, particularly those associated with postphenomenology (Ihde, 2009; Rosenberger & Verbeek, 2015) and Actor–Network-theory (Latour, 2014), contend that human experience and understanding of the world have been, from the outset, invariably mediated by technology (Kiran, 2015; Latour, 1994) —hence implying that technological self-transformation has *always* been a central aspect of human culture. That human beings have since ancient times resorted to artificial means to enhance their minds and bodies was also recognised by Michel Foucault (1988), who dubbed such practices “technologies of the self”. In the decades since Foucault’s death, this concept has been recovered, reinterpreted, and expanded by new strains of philosophy of technology (Bakardjieva & Gaden, 2011; Dorrestijn, 2012; Sharon, 2014; Verbeek, 2011), media philosophy (Gualeni, 2015), and philosophy of information (Floridi, 2011b).

This paper discusses Foucault’s original concept as well as some of its contemporary reinterpretations. Yet, it does so not to clarify its place within Foucauldian theory, nor to critically examine ICTs in light of his genealogical method. Rather, its aim is to show that, to a certain degree, *all* sociotechnical systems contribute to shape human self-understanding, and that recent developments in ICTs have significantly expanded the power and availability of our self-modifying tools. Enlisting the help of recent insights from philosophy of technology and philosophy of information, this paper argues that ICTs are exposing us to potent, inconspicuous forms of ontological *tinkering* [1], sometimes without us being aware of it. It contends that a growing number of aspects in our life, particularly the development of our social selves—and hence of our self-understanding—have effectively become *poietic* practices; that is, matters of *design*.

2 | WHY WE SHOULD THINK DIFFERENTLY ABOUT TECHNOLOGY

Over the last decades, a series of technological shifts largely triggered by the information revolution has deeply transformed human life. Ubiquitous computing, digital modelling and fabrication, machine learning and robotics, mixed and virtual reality, and recent advances in biotechnology such as CRISPR [2] are allowing us for the first time in history to *design* our lives not only in existential terms, but also at phenomenological, and biological levels (Gualeni, 2015). By enabling us to engineer and share experiences while spending greater amounts of time in different possible worlds (Gualeni, 2015) or “manifest worlds” (Feyerabend, 1996, p. 27), ICTs are effectively blurring the distinction between our offline and online environments (Floridi, 2011a). And by merging our virtual and physical worlds, they are thus not only enhancing but *re-engineering* reality itself (Floridi, 2010). By allowing us to create multiple personas, ICTs are deeply transforming how we present ourselves to ourselves and to the world, and therefore how we develop our personal identities.

As more aspects of our life become mediated by and dependent upon technological systems and as our relations with our appliances (e.g. smartphones) grow more intimate, the (traditional) distinction between “natural” and “artificial” human phenomena becomes more difficult to uphold. As more artificially “a-live” (see Floridi, 2007) agents join the nascent internet of things (IoT) and the potential emergence of strong artificial intelligence (AI) looms [3], what it means to be human and what distinguishes us from other entities in the world become widely contested notions. In other words, the validity of the subject vs. object distinction and the prevalence of modernist (anthropocentric) humanism has stopped being taken for granted, or, to borrow Latour’s (2005) formulation, they have turned from “matters of fact” into “matters of concern”.

In the context of critical theory, a field with a strong influence over art scholarship, technological systems continue to be regarded as limiting autonomous forces that constrain, rather than enrich, human action. This, regardless of the fact that an ever-increasing number of creative practitioners is exploring new aesthetic horizons opened by ICTs by tinkering with data, digital fabrication, or novel approaches to human-computer interaction (HCI). However, as Ratto (2011) suggests, a disconnect

between the way technologies are conceptualised and the ways they are employed and experienced still prevents many art scholars from treating sociotechnical systems as “matters of concern” [4]. Consequently, technologies continue to be conceived as phenomena that are intrinsically distinct or even antithetical to human nature, as things that evolve in parallel rather than in an intertwined manner with human societies. While posthumanist and transhumanist views have certainly gained popularity within art scholarship, in practice little reflection is done on the necessarily artificial—and thus technological—origin of many aspects of human life, including art itself.

3 | A THEORETICAL CONTEXT

In an essay published four years after his death, Michel Foucault (1988) detailed the origins and purpose of certain methods employed in classical antiquity and through Christendom by individuals who sought to transform (and enhance) their conducts, bodies, and minds. These “technologies of the self”, were not instruments or appliances in the contemporary (material) sense but rather practices or “existential tools” (Verbeek, 2011). While it is perhaps not one of the most well-known items in the Foucauldian toolkit, over the last years this notion has re-emerged in current analyses of ICTs. Although Foucault is not generally regarded as a philosopher of technology, as we will see in the next section, several of the points he makes in *Technologies of the Self* coincide with contemporary views on technological systems (Dorrestijn, 2012; Verbeek, 2011).

The origins of Foucault’s concept are to be found in a seminar he presided at the University of Vermont in 1982, the results of which were compiled and published a few years after his death. At the time, Foucault had embarked on a new line of enquiry that focused on the processes whereby humans “constitute[d] themselves as subjects” (Foucault, 1988). He had grown more interested in understanding how individuals historically sought to gain knowledge of themselves through dedicated epistemic systems and practices, and then use the resulting insights to control and modify their behaviour, and (ultimately) their self-identity. This project, according to Martin, Gutman, & Hutton (1988), represented the “logical conclusion” of Foucault’s previous research on the nature of power

and its dynamics in sexuality, mental health, and penology.

In his essay, Foucault identified four “major types” of “technologies” (1988, p. 18), although he conceded that neither of them could actually be found working in isolation. These were (a) technologies of production, (b) technologies of sign systems, (c) technologies of power and finally, (d) technologies of the self; the latter of which:

[P]ermit individuals to effect by their own means or with the help of others a certain number of operations on their own bodies and souls, thoughts, conduct, and way of being, so as to transform themselves in order to attain a certain state of happiness, purity, wisdom, perfection, or immortality. (Foucault, 1988, p. 18)

Depending on the historical setting, these practices could involve (but were not limited to): sexual explorations or abstinence; fasting and other dietary restrictions; physical and intellectual exercises; praying and meditation; journaling and epistolary exchanges; and what Adler and Doren (2006/1940) would call “syntopical reading”. Seeing Foucault’s definition, it seems as if “reading moral tales would be as good a match as body piercing or tattooing” (Bakardjieva & Gaden, 2011, p. 401).

Foucault understood these techniques as forms of “individual domination” (1988, p. 19), as the means through which people exerted power to control themselves; albeit for fundamentally ethical reasons. He traced some of these “operations” to ancient Greek and Rome, wherein certain individuals saw the practice of “caring for themselves” as a personal and collective duty. To these people, Foucault contended, “occupying themselves with themselves” and striving for personal self-improvement ultimately implied taking care of their *cities*.

With the rise of Christianity, however, the ethical root of self-actualisation became obscured and transformed. The original principle of “taking care of oneself” came to be seen as a form of selfish immorality and was gradually replaced with the more pious principle of “*knowing oneself*” (Foucault, 1988, pp. 19–20); which, in turn, became the “prerequisite for self-denunciation” (Bakardjieva & Gaden, 2011, p. 402). Self-actualisation thus morphed into *self-renunciation* (Foucault, 1988, p. 22) as ancient ethical

responsibility gave way to the new religious obligation of submitting one's body and soul to the power of divine will.

3.1 SITUATING FOUCAULT WITHIN CONTEMPORARY PHILOSOPHY OF TECHNOLOGY

'Classical' philosophers of technology such as Ernst Kaap, Martin Heidegger and José Ortega y Gasset (see Mitcham, 1994) were among the first to recognise that technical appliances shape our daily understanding of the world. Or, as Nietzsche once noted, that "our tools also affect our thoughts" (cited by Kittler, 1999). But apart from Kapp, who did not endorse the dialectical opposition between the natural and the artificial worlds and conceived technologies primarily as *extensions* of human capacities (Gualeni, 2015), the majority of these early thinkers portrayed technology in abstract, monolithic, and pessimistic terms. Heidegger (1977/1954), the most influential of them all, portrayed technology (and "Western metaphysics") as a limiting, utilitarian force which prevented human beings from experiencing the world in alternative (e.g. Pre-Socratic) ways. However, in the last decades of the twentieth century, philosophy of technology underwent a so-called "empirical turn" (Achterhuis, 2001; Ihde, 2009), as a new generation of scholars began to question their predecessor's treatment of technology as a monolithic, autonomous, and largely nefarious force. Emphasising "technical mediation" (Dorrestijn, 2012; Kiran, 2015; Latour, 1994), contemporary philosophers of technology, in particular those identified with Actor-Network Theory [5] (ANT) and postphenomenology [6] contend technology "co-evolves" with society (Ihde, 2009). They thus conceive technology as a modular network of systems, which can only be analysed and understood by observing their role within specific human practices [7].

Philosopher Peter-Paul Verbeek suggests that in Foucault's analyses power plays a comparable (albeit slightly different) role than the one technology played in Heidegger's work: that is, being that which ultimately structures society and culture (2011, p. 68). Heidegger and his contemporaries contended that the essence of technology had less to do with tools, instruments, and machinery than with a particular (utilitarian) mindset or "attitude" that pervaded every aspect of human life (Mitcham, 1994). When talking about technology, Foucault too was not referring to

physical instruments; this is evident in the following clarification:

[W]hat interests me more is to focus on what the Greeks called the technê, that is to say, a practical rationality governed by a conscious goal.... The disadvantage of this word technê, I realize, is the relation to the word "technology", [...] A very narrow meaning is given to "technology": one thinks of hard technology, the technology of wood, of fire, of electricity. Whereas government is also a function of technology: the government of individuals, the government of souls, the government of the self by the self, the government of families, the government of children, and so on. (Foucault, 1982/2001, p. 364)

Besides nodding to the Promethean myth as recounted by Plato, Foucault did not seem to endorse a fundamental distinction between human and technical dimensions. The way he describes technological influence does not necessarily imply a *de facto* negation of human agency and freedom (see Dorrestijn, 2012). For Foucault it seems clear that, as is the case with power dynamics, our engagements with technology do not happen in a vacuum, but against a messy and shifting backdrop of objects, institutions, and human relations. That is precisely why Verbeek (2011, pp. 67-68) contends that Foucault's stance is compatible with contemporary philosophy of technology.

During Foucault's lifetime—and apart from the emergence of recording and communication systems such as photography, video, and audio—the available "technologies of the self" continued to be roughly the same as those people had been using for millennia: procedures and behaviours; methods that required little or no direct action from material instruments. Yet, three decades after Foucault's essay was published the circumstances have changed, as most regions of the world have fully embraced the so-called information society, instruments that enable, accelerate, and deepen self-modification have become pervasive. Unlike the procedures Foucault described, these are technological systems in the "material" sense, and also with the capacity to influence self-transformation either by design or as a side effect. The following

section discusses two interpretations of this shift and its implications.

4 | EXPANDING FOUCAULT'S IDEAS

In a recently published book, philosopher and video game designer Stefano Gualeni (2015) shows how, by allowing us to access and interact with virtual worlds, ICTs can disclose “new human kinds of ontologies” [8]. Gualeni’s analysis is framed by postphenomenology and media theory; he endorses the notion that humans are “artificial by nature”, and regards technologies as a powerful but not definitive factor in cultural change due to their “inherent” capacity to extend our perceptual, intellectual, and operational abilities (2015, p. 73). He suggests that technological development can function as a vehicle for collective and individual self-expression; as a medium for humans to objectify their “worldviews, needs, and aspirations”. Therefore, technologies have the potential to disclose “specific forms of self-reflection and self-discovery” (2015, p. 73). Like most philosophers in the postphenomenological tradition, Gualeni regards technological instruments primarily as mediators; as systems that shape the ways we make sense of the world and hence, of our own selves [9].

Gualeni reframes Foucault’s notion of “technologies of the self” in terms of *transformative practices* conceived to elicit some type of long-term (and long-lasting) *transformative experience* [10]. He also reminds us that the ethical principle which, according to Foucault, motivated self-improvement practices in ancient Greece was more “projectual” than normative. Thus, the guiding question for the Greek citizen was not “‘How should I act to be a moral subject’ but rather ‘What kind of subject do I want to be’” (2015, p. 74). In summary, people engaged in self-transformation were not merely following an ethical dictum, but engaging in a *poietic* enterprise of “self-design”. It is precisely this creative aspect that Gualeni finds most appealing in Foucault’s concept.

Gualeni likens the process of “self-refashioning”, which Foucault characterised as a form of self-imposed power, to the way artists exercise power over their materials to produce an artwork (2015, p. 75). He suggests that creative projects (e.g., writing philosophical treatises or literary pieces, or designing virtual worlds) can also lead to highly transformative aesthetic *and* existential experiences, not only for the audience but for their creators too. And while video

game design is already widely recognised as an activity driven by a “creative urge”, Gualeni contends the *poietic* nature of this practice can be exploited for epistemic purposes. He thus notes that virtual world development may be regarded as a self-gnostic *method* through which designers can “realize their own beliefs and behaviour, and hence perform ethical and aesthetic self-fashioning” (2015, p. 76).

As for the wider cultural impact of current technological developments, Gualeni acknowledges the ubiquity of ICTs—and hence, of virtual worlds—is pushing our ontological frameworks into an increasingly “technically-mediated” context. This shift, he argues, has important consequences for the way humans understand and categorise their relationships with the world and with themselves. People are now able to “design their lives” not only in the “existential” sense (that Foucault described) but, increasingly, in “biological” (i.e., anatomical, genetic, physiological) and experiential terms (2015, p. 72). As a result, ICTs “allow human beings to objectify and overcome some of the phenomenological, operational, and ontological boundaries that characterize pre-digital thinking” (2015, p. 71). Through our daily interaction with these technologies, our traditional (modern) ontologies establish “a reciprocally influential relationship” with digital simulations and hence fragment and extend into formerly inaccessible worlds (2015, p. 72).

However, irrespectively of how profound these shifts might seem, Gualeni contends they are far from being *truly* radical, for they do not necessarily imply a true break with pre-digital human kinds of ontologies. Gualeni’s main point is that virtual worlds are but *idealizations* of existing (actual or imaginary) interpretations of reality, and thus they can only offer *alternative* ways of understanding time, space, physical properties and causality. It follows that irrespectively of how otherworldly a given digital simulation might appear, at the most basic level it is only a reformulation, a simple alteration, a reversal, or a recombination of existing ontologies. Secondly, Gualeni notes that human conception of the world is unavoidably constrained by our biology. This implies that every one of our constructs, whether imaginary or concrete, is ultimately a product of one or more human subjectivities. Finally, Gualeni argues digital simulations are necessarily filtered by the ontological architecture of computational technology, which itself is but a manifestation of a particular human form of

rationality. In summary, Gualeni claims that while ICTs can expand and reshuffle our conception of reality and of what it means to be human, it is unlikely they could ever allow us to completely transcend our human condition as transhumanist accounts often suggest.

4.1 PHILOSOPHY OF INFORMATION: ENVELOPMENT AND THE *INFOSPHERE*

Philosopher Luciano Floridi, one of the founders and leading proponents of (a constructionist) philosophy of information [11], warns that expecting questions to be solved by a “single, correct, absolute answer, independently of context, purpose, and perspective” (2014, p. 67) is illusory. Problems are *always* addressed from a given perspective or “interface”; this implies making certain assumptions, and compromises about the problem, its components, and its potential solution. Thus, to ask how ICTs are affecting human self-understanding implies at the very least to ask for a specification of what “the self” represents, what ICTs are, and how they operate. Since Floridi endorses “informational realism”; i.e., the belief that “as far as we can tell, the ultimate nature of reality is informational” (2011c, p. 361), he contends that “deep down” the nature of brains and bodies, and of minds and selves is *also* informational. That is to say, all of these things may be regarded as “different states of information, or different informational patterns” (2014, p. 71). Thus, Floridi characterises the self as a “complex informational system, made of consciousness, activities, memories, or narratives” (2014, p. 69).

Given the former criteria and that, by definition ICTs are any technology capable of manipulating information, Floridi argues that ICTs “are the most powerful technologies to which selves have ever been exposed” (2011b, p. 561). In the philosophy of mind, Floridi notes, there is a well-established distinction between personal identities (i.e. who we are) and our self-conceptions (i.e., who we *think* we are). In healthy circumstances, both poles reinforce each other. However, our self-conception is significantly flexible and can be affected by both the feedback we receive from other agents and by our own idealisations; this is the “social self” (2014, p. 60). Now, the reason why ICTs can influence and shape “who we are, who we think we are, who we might become, and who we think we might become” (2011b, p. 550), and they do so mainly by changing our *social selves*.

In an age where more and more people frequently use online platforms to broadcast opinions, tastes, intimate details and experiences, social selves, and therefore personal identities have become malleable to an unprecedented degree. If the social conditions of someone’s life are changed, if her network of relations and the type and frequency of information she is exposed to shifts, then the way she presents herself to the world is inevitably changed as well. This *projection* reflects back onto her social self, modulating her self-conception and therefore her personal identity (Floridi, 2014, p. 61).

ICTs can also meddle with our memories; and memory, as Floridi notes, “plays a crucial role in the construction of personal identity” (2011b, p. 562). Along with communication, one of the core functions of ICTs, and arguably their original function, is storing information. Throughout much of human history, external memory was only available to those few with the means to read and write. That changed first with global literacy and, later, with the emergence of analogue and electronic “media” (i.e., non-text based ICTs such as image and audio recording systems), and the internet. Through the various platforms and services that allow us to accumulate, upload and share an ever-growing flow of memories in all sorts of data formats, we are granting ICTs unprecedented power to influence us back. As Floridi notes, until recently, the relation between ICTs and the construction of personal identities online had been regarded in rather optimistic terms; it was believed that these technologies would mostly empower individuals by granting them more freedom to choose who they wanted to be (2014, p. 72). This account is now more nuanced as it is clearer “the more memories we accumulate and externalise, the more narrative constraints we provide for the construction and development of personal identities” (2011b, p. 562). In fact, by increasing, objectifying, publicising, and fixating our memories online we are actually *constraining* our ability to define (and redefine) ourselves. For whereas the process of “forgetting is also a self-poietic art” (2011b, p. 262), the Internet never “forgets”.

Floridi also contends that ICTs are not only modifying our mental self, but our relationship with our bodies too. Telepresence magnifies the distinction between physical presence and location that our written language inaugurated [12]. Who we are increasingly means who we are *online*. Human relations can now

happen exclusively through digital mediation. And because the internet does not forget, our virtual selves can become “chronologically misaligned”, since digital avatars may outdate but they do not grow old. Furthermore, as ICTs merge with more sophisticated imaging and visualisation systems [13], we acquire the ability to “measure, model, simulate, monitor, and manage our bodies ever more deeply, accurately, and non invasively” (2014, p. 77). Our bodies, to use a programming metaphor, are rapidly becoming white, and even transparent, boxes —at least in visual terms.

While a many of the changes brought by ICTs involve some form of virtual environment, our physical world is also being reshaped. Over the last half century, thanks to the growth and development of computational technology, our informational environment or “*infosphere*” [14] (Floridi 2010) has been expanding. Meaning that not just communications and entertainment, but every other aspect of human life, such as social interactions, businesses, education, transportation, healthcare, governance, law enforcement, etc., is being integrated into our digital environment. The infosphere is rapidly becoming our default habitat: the world where we live in. Hence, our conception of reality is becoming increasingly more dependent on informational frameworks and tools.

However, instead of fitting our technologies to the preexisting limits of our world, we are instead adapting both our environment *and* ourselves to our ICTs [15]. Our technologies are *educating* us as users. This integration involves a greater “*envelopment*” [16] of our physical world (Floridi, 2012). Envelopment, Floridi argues, “used to be either a stand-alone phenomenon” (e.g., a dishwasher, which is a machine built around an enveloped “micro-environment”) or one constrained to a particular space (a car factory filled with hundreds of robots). However, the ubiquity of cell sites (cell towers) and Wi-Fi hotspots has enveloped and transformed our physical environment, making it a more technology-friendly place where our also ubiquitous smart devices can gather, transmit, and process vast amounts of data on a permanent basis (2012, p. 252). Thus, in the words of Floridi:

Enveloping is a trend that is robust, cumulative, and progressively refining: everyday sees the availability of more tags,

more humans online, more documents, more statistical tools, more devices that communicate with each other, more sensors, more RFID tags, more satellites, more actuators, more data collected on all possible transitions of any system, in a word, more enveloping. (Floridi, 2012, p. 252)

This is what has allowed purely syntactical and, hence, semantically incompetent systems to become so powerful as to be considered “smart”.

Enveloping is closely tied with another fundamental change triggered by ICTs, which Floridi calls “*re-ontologising*”. He claims that by adapting ourselves to—and making sense of our world through—information technology we are contributing to “a very radical form of re-engineering [...] that not only designs, constructs or structures a system [...] but that fundamentally transforms its intrinsic nature” (2012, p. 251). ICTs grant us access to ever more sophisticated alternative worlds, this in turn implies a shift from a materialist (Newtonian) understanding of reality to an informational (digital) one. In this way, the precondition for “existence” is no longer immutability (as the Greeks believed) nor perception (as modern metaphysics contended), but *interaction*, regardless of tangibility (Floridi, 2010). Secondly, envelopment is blurring the distinction between offline and online environments. Reality is being progressively enhanced as our physical habitat merges with the abstract world of cyberspace. Finally, ICTs allow us to interact not only with other human agents, but also with “a-live” (artificially live) agents (Floridi, 2010), from ‘bots’ to a growing panoply of smart appliances.

5 | DISCUSSION

At the beginning of Section 4 we saw Gualeni claims the “core” of ICTs’ cultural impact is that they allow us to access different possible worlds, and that our exposure to digital simulations is fragmenting and expanding but *not* radically transforming our pre-existing ontological frameworks. The argument being that, despite their objectified and otherworldly nature, virtual worlds are *always* designed for and experienced by human wetware. Hence, the ontologies they disclose are not (cannot be) radically different from those found in real life, only distorted versions of them.

Given the previous assumptions, it is fair to ask what would it take for an ontological change to be deemed

truly radical? Gualeni does not offer detailed criteria but he does mention that transcending traditional ontologies implies a change that is “alien and incompatible” (2015, p. 164) with every possible way in which humans experience the world. In other words, a radical alternative ontology should be utterly inapprehensible for a human mind, i.e. it should be a rationalisation of a worldview accessible only to some type of non-human “conscious exotica” (see Shanahan, 2016).

Gualeni has set the bar high, but since the very definition of “human” is (and presumably will continue to be) an open question this leaves some room for ontological tinkering. ICTs will continue to allow us to simulate and *experience* even the most bizarre alternative worlds we can imagine, and with growing levels of fidelity, more so now that new generations of AR and VR technology are becoming available to more people. Furthermore, due to their informational nature, computational simulations are (at least theoretically) “permanently extendible” and “deeply remixable”, which means virtual worlds cannot only be expanded, updated, and rewritten, but also prone to “hybridising” (see Manovich, 2013).

The higher the number of available virtual worlds, the more we can interact with them, and the larger the sources for imagining and constructing even stranger ontologies. Yet, granting the truth of Gualeni’s arguments, even the most exotic ontology we could devise would *still* be of human origin. It follows that while ICTs can indeed help us to imagine, tinker with, and experience alternative ways to be human, i.e. to serve as “technologies of the self”, they cannot otherwise assist us in *transcending* our humanity.

The question is, whether ontological changes need to be “alien and incompatible” with pre-existing human frameworks in order to be truly revolutionary. Sometimes, seemingly small shifts can lead to long-term, unpredictable, and radical changes, particularly when dealing with complex nonlinear systems. Arguably, our worldviews are not the sole product of our minds, as embodied creatures, our *circumstances*—as Ortega y Gasset (1966/1914) argued—also play a crucial role in informing our experience. Extrinsic changes (in our environment) affect us intrinsically; they reflect back onto our self-understanding, and often in unpredictable ways. And ICTs, as Floridi showed, are doing precisely that:

changing our environment in seemingly subtle and yet potentially radical ways.

The envelopment of our physical reality, along with the ubiquity of computational appliances is turning the distinction between “onlife” and our Newtonian reality anachronistic. Cyberspace is no longer just an alternate world which we enter and exit at will, but which has gradually turned into a permanently available and (for some people) more socially active layer of our lives; an extension, of our existential reality. Whatever we do online can now directly influence our physical selves, and vice versa. What happens in virtual worlds does not stay in virtual worlds. By *re-ontologising* our environment, ICTs are indirectly shifting the “way we understand and rationally organise our experience of the world”; and in the process, they are also shaping our self-conception. And yet, while this process is not as spectacular as what certain dystopias (e.g. *Blade Runner*, *Neuromancer*, *The Matrix*) have imagined, the ontological implications following them are in no way trivial.

ICTs are allowing us for the first time in history to develop and interact with non-biological “smart” appliances [17] —“Intelligence” remains a strong word. However, regardless of how unsophisticated these technologies might still be, their role in human affairs is growing exponentially. Recent developments in machine learning, and particularly in Artificial Neural Networks (ANN), have made these systems better at guessing and influencing our wishes, recognising our faces, buying and selling stocks, helping to make healthcare decisions, etc. And while computational technology is indeed (as Gualeni claims) the materialisation of a particular form of human rationality and this would imply in principle that AI stands on the same ontological plane as human intelligence, reality is more nuanced. Specifications do not necessarily entail implementation, particularly when dealing with complex systems with multiple interdependencies. Problems such as (the lack of) interpretability (see Bornstein, 2016) of ANNs raise questions about the possibility of algorithmic thinking being similar, or even comparable to human thinking. The potential emergence of “strong” AI would arguably lead to a radical shift in the way we define being human. As it would not only mean that we would stop being the only intelligent agents on the planet (at least by

human standards), but that we might be dealing with potentially *exotic* intelligences.

Yet, any argument concerning (strong) AI and its impact on human affairs is necessarily speculative. There is still an enormous gap between what we may call the “technoscientific reality” (or implementation) and philosophical thought experiments. The fact is, we do not know, nor can we predict how a given technology might affect (either positively or negatively) our existence both physically and ontologically. What we can do, as contemporary philosophers of technology and Foucault propose, is focus on how certain technologies influence specific practices and human contexts.

6 | SOME IMPLICATIONS

Much of what we are, or rather, of what our social selves are, has been incorporated into the “infosphere”. This has happened out of our own volition but also without our knowledge or consent. We all have some form of data trace; either directly or indirectly linked to us. Having a birth certificate or some other form of registry in a government institution, having a bank account, using the internet, owing and using a mobile phone, and so on and so forth; all of these things are part of our informational selves. Our social self is now more available, more interpretable, and more editable than ever. The life-narratives of many people (whether accurate or not) stand one “googling” away.

Our social selves are therefore permanently subject to change. We can edit, curate, and tinker with the *information* that is available about ourselves without major hacking skills. Whenever we access social platforms and interact with other people, whenever we add content to our personal websites, whenever we use the internet we are constructing and modifying our social selves. Who we are is also who we seem to be on Facebook, on Twitter, or any other platform. Tinkering means adjusting, changing, experimenting without doing so systematically. We tinker with our profiles, we choose and edit our selfies, we make opinions available.

Although the techniques Foucault perhaps had in mind were employed by individuals living millennia ago, humans have never stopped seeking to enhance themselves. People today exercise power and control over themselves to develop more attractive bodies, to follow more healthy lifestyles, to live ethically, to be

more productive, or even to transcend the limits of their human condition. Dietary fads and movements (from “good food” and craft beer to veganism and juicing), exercise routines (from yoga to CrossFit), productivity methods (from time-boxing to standing desks), mindfulness and meditation; all fit within Foucault’s original concept. We may even argue the current tendency of self-actualisation is returning to the classical principle of “taking care of one self”. What has changed are the specific reasons why human desire to transform themselves, along with the availability and the complexity of the tools designed to achieve it. Foucault’s concept is not only current, but can easily be employed to categorise the new generation of instruments and techniques of self-transformation and enhancement.

Yet, our current technologies of the self are not *only* those specifically designed for that purpose (i.e., wearables, tracking devices and services). As we saw in the previous discussion ICTs alone can have profound impact on the way humans present themselves to themselves. Physiologically speaking we might have not changed that much over the last two thousand years, but from a socio-cultural and technological standpoint the changes have been dramatic, particularly those that occurred within the last fifty years. By allowing us to interact with virtual worlds, ICTs have opened a whole new dimension in which we may speak of self-actualisation, more so when the things that happen in those virtual worlds have direct consequences on physical reality. Self-enhancement is no longer carried out at physical or mental levels, but at *informational* levels too.

The two analyses discussed in sections 4 are not incompatible, but they do differ in some important aspects. Both provide insightful reformulations of Foucault’s concept to address the cultural impact of ICTs. Some of the arguments underpinning Gualeni’s cautious assessment of the ontological impact of ICTs are debatable—particularly the one concerning the human imprint of computational technology—but his reinterpretation of self-fashioning as a *poietic* process is rather insightful. Particularly for the analysis of contemporary aesthetic practices involving radical body design and posthuman performance. Whereas Floridi’s framing of selfhood in terms of informational systems offers a non-psychologistic explanation of how ICTs can meddle with our self-understanding. The notion that humans *are* their information (from their genetics all the way

up to their mental states) is conceptually illuminating and methodologically valuable. In the end, it seems the tension between Floridi and Gualeni has more to do with the level of abstraction each of them is proceeding from.

7 | CONCLUSIONS

Foucault's notion has acquired new meaning and relevance in the midst of the ongoing technological shifts. There are at least two senses in which we can speak of "technologies of the self": Foucault's original practice-oriented notion, and its contemporary materialisation. What in Foucault's time were deliberate operations, in our current context are also the unintended consequences of our daily interaction with technology. ICTs are re-ontologising our context and therefore profoundly altering how we conceive and shape our sense of self. The introduction of these systems is 'disruptive' in positive and negative ways. ICTs can become potent agents of change within social and economic dynamics, but they can also bring unforeseeable problems. Whether ICTs are ultimately changing what it means to be human remains an open question but meanwhile they are allowing us to tinker with our identities in ways that are truly unprecedented.

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ENDNOTES

[1] Tinkering is used here not in the (negative) sense of "meddling", but rather in the sense of "adjust[ing], or work[ing] with something in an unskilled or experimental manner" (Merriam-Webster.com, 2017).

[2] An acronym for "Clustered Regularly Interspaced Short Palindromic Repeats", CRISPR is a genomic feature that helps many species of bacteria to guard themselves against viruses (bacteriophages). First noticed in the early 1990s (Greenwood, 2017), since the turn of the century CRISPR has led to various (controversial) techniques which "allow highly targeted editing of genomes" (Hsu, 2015), and thus

the possibility of editing the genetic code of virtually any organism, including humans (Ledford, 2015).

[3] For an entertaining summary of the current discussions concerning the impact of AI in human life see Ceglowski (2016). A more "academic" account can also be found in Floridi (2015).

[4] Ratto's own contribution to a critical reflection on the socio-cultural impact of technologies is what he calls "critical making" (see Ratto 2011), a constructionist-inspired practice that uses technical appliances as vehicles for scholarly reflection.

[5] ANT may be seen as a form of relational ontology which characterises the world as a network of relations between human and non-human "actants", emphasising the mutual self-constitution of human beings and technological systems (see Rosenberger & Verbeek, 2015, pp. 19–32).

[6] Oversimplifying, postphenomenology may be seen as a "hybrid", pragmatic phenomenology; a "style" of philosophical analysis that focuses on human–technology relations (2009).

[7] According to this view, there is not a single "technology", but multiple *technologies*. Which means technologies are not intrinsically antithetical to the human spirit —as certain strains of critical theory sometimes imply, nor neutral, but necessarily defined by the circumstances and agents that use them. As Don Ihde puts it, "when divorced from human praxis" instruments are but "junk lying about" (cited in Verbeek, 2005, p. 117).

[8] In this context, "ontology" means "a rationalisation of a particular worldview, a certain relationship established by a being with reality" (Gualeni, 2015, p. 141).

[9] That is why, from a phenomenological standpoint *all* technologies can —to a greater or lesser degree— be regarded as "technologies of the self".

[10] Gualeni points out that transformative experiences can also emerge accidentally from circumstances that were not deliberately intended to elicit them.

[11] As described by Floridi (2011c, p. 14), the philosophy of information studies the life cycle, dynamics, and utilisation of information; and elaborates and applies information-theoretic methodologies to philosophical problems.

[12] Writing allowed humans to communicate diachronically across time and space (somebody's thoughts could be read at a distance and through generations); electronic communication systems furthered the gap between presence and location by decoupling information from a physical medium (emails arrive instantly).

[13] Systems that allow us to conceptualise, perceive and measure things that would otherwise remain hidden from the naked eye, including thermometers, microscopes, X-rays, fMRI, etc.

[14] This is an “environment constituted by all informational entities (thus including informational agents as well), their properties, interactions, processes, and mutual relations” (Floridi, 2012, p. 251). The “infosphere” is neither completely virtual, nor entirely physical; it harbours digital, as well as offline and analogue “spaces of information” (Floridi, 2014, p. 59) and therefore it should not be confused with “cyberspace”, since this domain is only one of the infosphere's “subregions”.

[15] As biological creatures, our capacity for adapting to changing environments is many orders of magnitude greater than that of (current) technological systems. For instance, regardless of how smart our most advanced machines might seem —e.g., neural networks, their ability to function remains overwhelmingly dependent on the contexts for which they were created.

[16] An “envelop” or “reach envelop” is a term borrowed from robotics, and it refers to “the three-dimensional space that defines the boundaries that the robot can reach” (Floridi, 2012, p. 251).

[17] Surely humans have engaged in animism for thousands of years. But unless we believe in magic, it is difficult to concede that, for example, a (horseless) carriage might have transported its occupant for 32 km to receive a bloodletting, or that a medieval scholar could put out a candle by simply uttering a voice command.

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