

Technological design as practice: a look beyond artifactual instrumentalism and merely human agency

O design tecnológico como prática: um olhar para além do instrumentalismo artefactual e da agência meramente humana

Helder Buenos Aires de Carvalho

<https://orcid.org/0000-0002-5595-611X> – E-mail: hbac@ufpi.edu.br

SUMMARY

The paper is based on the thesis that technological creation or design should not be viewed as an activity entirely determined by internal criteria for developing artifacts, as if these could have only a single, identical form and function, depending solely on their material properties. Like any other socially established human practice, technological creation or design is a human action and, as such, is subject to moral and political evaluations. For this purpose, we adopt Alasdair MacIntyre's neo-Aristotelian perspective and his concept of practice, in which the normative dimension of practices is not an external factor applied to them but is constitutively internal, stemming from a *telos* that defines them as parts or forms of realizing human excellence. In this sense, technological design is not axiomatically neutral but ontologically related to the social and political determinations linked to human actions and their various possibilities of material and symbolic being. Thus, it is a social practice that carries both internal and external ends and values in the MacIntyrean sense, and it cannot be understood outside the social fabric of which it is a part. Therefore, it bears ethical and political constitutive elements which, if disregarded in its constitution, obscure the complex nature of technology and its moral and political implications, dehumanizing it in its entirety.

Keywords: Technology. Practice. Virtues. Ethics. Moral Agency.

RESUMO

O artigo parte da tese de que a criação ou design tecnológico não deve ser vista como uma atividade inteiramente determinada por critérios internos ao desenvolvimento dos artefatos, como se estes pudessem ter somente uma única e mesma forma e função, dependendo apenas de suas propriedades materiais. Como qualquer outra prática humana socialmente estabelecida, a criação ou o design tecnológico é uma ação humana e, como tal, sujeita a avaliações morais e políticas. Para esse propósito, adotamos a perspectiva neoaristotélica de Alasdair MacIntyre e seu conceito de prática, em que a dimensão normativa das práticas não é um dado exterior a elas aplicado, mas constitutivamente interno a partir de um *telos* que as define como partes ou formas de realização da excelência humana. Nesse sentido, o design tecnológico não é axiologicamente neutro, mas ontologicamente relacionado às determinações sociais e políticas vinculadas às ações humanas e suas diversas possibilidades de dever ser material e simbólico. Assim, é uma prática social portadora de fins e valores internos e externos a ela, no sentido macintyriano, não se compreendendo fora do tecido social do qual faz parte, portanto, carregando consigo elementos éticos e políticos constitutivos que, desconsiderados de sua constituição, obliteram a natureza complexa da tecnologia e suas implicações morais e políticas, desumanizando-a em sua totalidade.

Palavras-Chave: Tecnologia. Prática. Virtudes. Ética. Agência Moral.

Introduction

The reference that humans make to technological artifacts in everyday situations, both in common sense and in theses supported by several generations of philosophers, scientists, and engineers, is that they are objects in the world subject to human agency, available to human desires and purposes, with neutral value and as carriers of objective configurations that point to a single historical direction seen as necessary in their development and appropriation. This common view, held by ordinary people and philosophical sectors alike, is, in fact, a constant source of ideologically motivated justification for the direction that technological design and development have historically taken, such as that driven by advanced and financier capitalism, more recently manifesting itself as digital platform capitalism¹. Often, it serves as the basis for the dismissive accusation that all criticism of the contemporary intensive presence of technologies in our lives is “technophobic”; that is, against the development of technological design to increase human progress and enlightenment.

However, this ingenious demonization of criticism is the result of the complexity of the technological phenomenon itself, as it carries the same ambiguities inherent to all human agency. Human action is not univocal but is marked by both material and social mediation. We do not act in a vacuum but always within concrete historical, environmental, economic, and societal contexts. Additionally, human action is influenced by the subjectivity of conscious individuals, who are bearers of desires and fears, and it is relational, as we always act together with other human and non-human entities, including animals, plants, and all the technological artifacts that surround us. This human agency is not absolute or libertarian, where the world and

¹ See Srnicek (2016).

its objects are at our disposal independent of external interference. On the contrary, it always occurs within different possibilities and potential courses of action, including those offered by the technological design itself in all its material and digital varieties, configuring choices, meanings, and values embodied in different practices.

Technological design, as a human action, suffers from these same circumstances and characteristics and cannot be seen as the mere manipulation of exogenous natural materials but as part of the relational structure of human agency². In this sense, it is no longer appropriate to think of it as something immune to the ethical and political issues inherent to the lives of humans in their inter-human environment of cities and their relationality with non-humans and the materiality of the environmental world. More than instruments, technological artifacts are constitutive forms of human action, and their creation is a social practice interrelated with other human practices that shape social life.

Technological design as a social practice: a relational and teleological look

We propose to understand technological design as a social practice in the sociological-philosophical sense established by the Scottish thinker Alasdair MacIntyre, that is, it should be defined, differently from the ordinary use of the word, as any complex and coherent form of collective human activity, socially established, through which

[...] internal goods to that form of activity are realized in the course of trying to achieve those standards of excellence which are appropriate to, and partially definitive of, that form of activity, with the result that human powers to achieve excellence, and human conceptions of the ends and goods involved, are systematically extended (MACINTYRE, 2007, p. 187).

In this sense, skillfully kicking a ball is not a practice, but playing soccer is; driving a nail into wood is not a practice, but carpentry is; planting potatoes is not a practice, but agriculture is; building walls is not a practice, but architecture is. Similarly, research into physics, chemistry, and biology, the work of historians, painting and music, etc., are practices. These encompass a wide variety ranging from arts, science, games, politics, and even the formation and support of family life, as well as the activity of technological design. Social life is configured precisely as an extensive network of interrelated practices, each one with its standards of excellence and conceptions of goods and ends involved, forming a human fabric of meanings that attribute some general defining *telos* of the good human life, of its excellence as a way of living and being taken as a whole³.

Every practice has internal and external goods that give it meaning, articulated from a conception of human good that gives it a place in the set of social life and human life considered as a whole. So, practices are part of larger historical narratives that organize social, economic, and political life into a cultural and symbolic totality subjected to dynamic reformulations and transformations. As they are diverse and multiple, each one with its specific goods, sometimes in conflict with other practices within societal life, is necessary, according to MacIntyre, some conception of human good that orders and establishes evaluative criteria by

² Cf. Ihde (1990), Verbeek (2005), Jonas (1984), MacIntyre (1999).

³ For a more extensive perspective of MacIntyre's concept of practice, see Carvalho (2012) and Horton e Mendus (1994).

articulating them within the whole of common life. One of the central challenges of societal life is precisely to establish this horizon of human good that organizes the multiplicity of its practices, in historical, social, material, and symbolic forms. Hence why the enormous diversity of philosophical, social, and political conflicts that happen in contemporary life, in which an international institution like the UN doesn't even seem to make much sense in its ability to resolve such differences⁴.

The internal goods or goods of excellence of a particular practice are those that can be realized within it, carrying a story, representing its *telos* – reclaiming here a certain Aristotelian sense –, which benefit the entire community of practitioners, not just a part of it. And external goods (or effectiveness goods) are those that are realized not only in a specific practice, such as money, power, and wealth, representing the institutional dimension of social practices, the benefit of which is not necessarily shared by all its practitioners. The historical development of practices implies an expansion of human powers within their scope, towards excellence in their specific art; but this historicity is not autonomous from the social and environmental fabric in which it develops and exercises itself. This excellence of internal goods is intrinsically located within the greater excellence that situates practices in the collective praxis, that is, of the human good or the good human life as a superior *telos* that defines its meanings.

Let us take an example in the context of technological design: in the same way that a hammer does not exist by itself as an isolated artifact⁵, but acquires meaning and existence as a constitutive part of the arts of carpentry or metallurgy, a practice also acquires its meaning, validity and valence within the consideration of what human excellence is, the good life that gives meaning to different practices, ordering and articulating them historically, as formative parts of the social and environmental fabric in which we are situated and of which we are constitutive parts. The art of carpentry or metallurgy, like the others, in turn, is not an isolated practice but acquires its existence and meaning within the network that connects, among other things, from primary human needs for survival, improvement of conditions of housing and transportation, the production of economic existence, the aesthetic forms associated with them, as well as the fabric of symbolic and material interrelations that connect the environment, humans and non-humans.

Thinking about technology as a practice means, then, understanding it in its multistability, that is, in the technological design as a praxis that carries moral and political meaning, subjected to evaluations that go beyond its material immanence (that of the artifact of cell phone or hammer taken alone, for example). It allows us to place it in the space of choices, of multifaceted aspect that is typical of human agency, since it is an activity, whose paths are diverse, whose possible developments aim at different objectives, and alternative ways of being and living. Any technological artifact is not a product whose way of being and function is unique, that is, it would only be possible to be developed under a single form and materiality, objectively arranged and teleologically already defined. Its existential concreteness is, in fact, the result of choices, subjected to varied determinations, ranging from its raw material already available or even created for that purpose, through the limits of available knowledge and aes-

⁴ As Vaz (1995, p. 55) has reminded us, "All problems of survival and coexistence, including those that are situated in the field of conflictive relations between the First and Third Worlds, are perfectly solvable, have their constants and variables known and the solutions are within the possibilities of current humanity. It is not, therefore, in the field of the production of material goods and the satisfaction of vital needs that the deep crisis takes shape. It is in the field of reasons for living and ends capable of giving meaning to the human adventure on earth". And, updating Vaz's diagnosis, it is around these ends that the great debate surrounding the intensive presence of technologies in our actions and ways of living can be found.

⁵ I refer here to the classic example of the hammer analyzed by Heidegger in *Being and Time* (HEIDEGGER, 2012).

thetic preferences and economic and social opportunities, as well as by the set of moral and political values that define the context of its emergence. In other words, technological design is not a one-way street, which has only one existential possibility but is inscribed in a direction that suppresses other possibilities, choices, and values in its historical effectiveness, by privileging one path to the detriment of others.

Design belongs to the political and moral sphere because it is not located on the same plane as science, the search for objective knowledge of the world and human things, but within the scope of the praxis of what should be⁶. The technological design seeks to build worlds, in which ways of being and living become possible, that is, it postulates a conception of humanity, of a good life that represents the realization of its proper excellence, its flourishing. In this sense, it is a human action loaded with meaning and moral and political values that constitute the human community, not only the creation of isolated tools that do not interfere with the latter's historical purposes. On the contrary, to the extent that it operates in the direction of what human and non-human worlds should be, by giving them either material or virtual forms and constructing them as grounds for the flourishing of certain ways of being and living, technological design becomes the bearer of forms of morality and politics, that is, the producer, enabler or mediator of certain material, moral and political goods.

To the extent that, for instance, the practice of modern intensive agriculture is increasingly mediated by technological artifacts, the design of these artifacts effectively responds to certain needs of this practice, dealing with the problems that emerge in the development of agriculture, in the face of growing demand for food in a world increasingly occupied by the human species. However, this primary instrumentalization of technological artifacts, in which they are initially situated as tools for solving problems posed by human needs, is not inconsequential, as if it were unilaterally determined by them. The intense mechanization of agriculture transforms this social practice based on other moral and political values, as far as mechanization places agriculture at the business level, that is, no longer as a practice linked to the food needs of a family or social group that is delimited geographically and historically, but as mass production of goods for consumption, now, in a broad global network of exchanges of an economic system, a possible way of producing life among others.

Contemporary agribusiness is the expression of this historical transformation of the practice of agriculture and the goods and values previously linked to it, in which the technologies generated in its surroundings are aimed precisely at enabling and realizing this new horizon of exploration of the natural environment, arable land, now seen as an object of appropriation for marketing interests – something that would be unfeasible without these same technologies and which generates enormous destructive environmental impacts on the life in our planet. If we take agroecology as a counterpoint, for example, the entire set of technological artifacts that are placed in this perspective is quite different from that of agribusiness, as there is a different set of principles from that way of thinking of the natural environment as a valuable reserve awaiting expropriation by humans. The technological arsenal of agroecology has a different design precisely because the practice of agriculture is seen and exercised from other values, its goods and ends are at the service of another conception of the excellence of this practice, an excellence, in turn, linked to a conception of humanity not separated from the integrity of nature as a whole and the relationships of solidarity and sharing that are at its base⁷.

⁶ Although today one can speak more than ever not only of technique or technology, but of technoscience, by the interface between science and technology, especially since modernity. Don Ihde (2009) goes further than this, arguing that science has always been technologically mediated, that is, it has always been technoscience.

⁷ To better understand agroecology and its values and aims, see Wezel *et al.* (2020); Wezel *et al.* (2014); and Tait, Neves, Gonçalves (2020).

Modern technological development in intensive agriculture no longer follows food values linked to the way of life of a relatively small community, placed in a well-defined ecological and material context, but allows food to be transformed into commodities, in the form of a product not linked to the way of being of a historically constituted human community. Modern technological development in intensive agriculture no longer follows food values linked to the way of life of a relatively small community, located in a well-defined ecological and material context, but allows food to be transformed into commodities, in the form of an uprooted product. Technological design transforms the practice of agriculture into something different from its original condition, modifying the way of life of humans, the social network in which it made sense, introducing other meanings in the relationship with the environment and with other humans, qualitatively altering their actions, both materially and socially – as Hans Jonas (1984) pointed out, modern technique substantially alters the range and power of human agency. But this does not happen unilaterally, as the diverse practices of technologically mediated societies are also, at the same time, altered and modified by these same technological designs; and not necessarily with intended and predicted consequences in their formulation⁸, but also in unexpected and often quite perverse ways for humans and non-humans – an important indicator of this is the problem of environmental emergency caused by intense human intervention in the terrestrial environment through its growing technological power, which raises serious issues of environmental justice, as well as risks to the survival of life on the planet⁹.

Technological design is, therefore, not a practice isolated from other social practices, but is part of an ecology of practices, in which they all intersect, producing mutual changes and generating different meanings from this interrelationship. Like every practice, its ontological condition is relational, its artifacts are not entities whose meaning, and function are previously established and determined, without history. Human becoming is linked to the becoming of its practices and, especially, the practice of technological design, as this transversally crosses other practices by providing the material bases necessary for the functioning of social life; and it does so in a way that is not only functionally and evaluatively sterile, but also alters the becoming of other social practices and the horizons of meaning and significance that we attribute to ourselves and the world. As Ihde e Malafouris (2019, p. 195) remind us

Humans, more than any other species, have been altering their paths of development by creating new material forms and by opening up to new possibilities of material engagement. That is, we become constituted through making and using technologies that shape our minds and extend our bodies. We make things which in turn make us.

Since Marx, we have known about the intimate connections between economics and technique, both intensely constituting the practice of politics and sociability; but in the contemporary world, this becomes more clearly intense, as our societies are increasingly technological in all their spheres. We see ourselves today as technical civilizations, in which the practice of technological design has become central in terms of defining our own way of being and living – as Jonas (1984) had warned, modern technology has become not just a means, but an end to our way of living. The practice of technological design has become an essential requirement for the development of other practices, from health, agriculture, fashion, body care, aes-

⁸ What Vallor (2016) calls growing technological opacity, that is, the difficulty in being able to predict consequences and possible futures with the increasing and intense adoption of technological mediations in human life.

⁹ See Wallace-Wells (2019) and Crary (2023).

thetics, commerce, industry, transport, security, education, politics and social communication, and even in science itself, providing certain standards of excellence and effectiveness.

The ideal of efficiency contained in technological promises has become the miraculous Midas touch for all our problems; however, this central place is misleading, as technological design carries the same relational ontological structure as other practices: it does not exist on its own, isolated in its own ways of making and engendering material and virtual artifacts, as if it had only an internal economy. As Jonas (2013) argues, all human actions are subject to ethical and political evaluation when they manifest themselves in the form of power, as is precisely the case with technological activity as an exercise of human power:

That ethics, speaking more generally, has something to say about the subject of technique, or that technique is subject to ethical considerations, is something that follows from the simple fact that technique is an exercise of human power, that is, is, a form of action [Handelns], and every form of human action is subject to moral evaluation (JONAS, 2013, p. 51).

The “forgetfulness” – ideologically biased – of this reciprocal relational ontology of humans and technological artifacts¹⁰ is what produces the serious illusion of its apparent neutrality, independence, objectivity, and one-dimensional development. Getting out of this muting oblivion of the responsibility involved in technological design as a human action is a necessary first step so that we can change the perception of the place it occupies in our technological societies, raising the ethical and political questions that can always be asked so that all human actions are also recognized in this context: What good are we generating? Who is it good for? Does it do justice to what or who? Does it contribute to human well-being as a whole, including non-humans as well? What *telos* does it propose in its realization? What humanity will we accomplish?

Technological design certainly plays an essential role in humans’ fight against the natural forces that surround us and threaten us from all sides, from microscopic organisms, that produce deadly diseases, to harmful effects produced by uncontrollable natural events, such as cyclones, earthquakes, seaquakes or extreme weather events. Technological design has always been part of this process of reducing or eliminating human vulnerability, as an animal being and a participant in the same nature from which it emerged. In this sense, technological design has always carried a promise of protection and realization of the fundamental human good, which is the dignified human existence itself on a planet that is, at the same time, our home and residence, a place for realizing our possibilities and excellences, as well as a place also fertile in threats and inhabited by many destructive forces.

But like all human action, technological design not only has the gift of grace but also of sin; it is the bearer of countless wonderful achievements, such as vaccines, healthy housing, abundant food, fast communications, *etc.*, as well as enabling destructive powers, weapons of mass destruction, massive contamination of rivers, seas, and lakes by poisons and pesticides, contamination of large areas by nuclear radiation, alteration of entire natural environments, including the atmosphere, which threaten life on the planet. Furthermore, recognizing its relational nature, like all human action, is also recognizing the very vulnerability of technological design as a human creation, as a social practice, despite all its powers acquired in its association

¹⁰ Heidegger, both in *Being and Time* (2012) and in *The Question concerning Technology* (1977), had already anticipated this relationality of humans and technological artifacts. About this, see also Ihde (2009).

with modern science, therefore, as an appropriate place to the question about its ends (telos), that is, about the ethics and politics that it generates and makes viable.

More-than-human human agency: the technological mediation of artifacts

Thinking about technological design as a practice, in the Macintyrean sense that we proposed here, means not only asking about the morality that it carries with it but, just as important, asking about the nature of this human agency that is located in the middle of a fabric social, therefore, full of intertwined practices, permeated by the intensive presence of technological artifacts, that is, in an almost entirely technologized society – as is especially the case in advanced capitalist societies¹¹ and their cyberspace¹². What we have is a complexification of human agency, in which it is no longer just a conscious subject, abstractly thought of as rational, who decides and chooses their actions in the face of a world of external objects and with different possible courses of action, which is up to they exclusively evaluate within their subjective consciousness, along Kantian lines, for example, or taking into account a simple consequentialist calculation.

This human agent is now permeated by a network of relationships with other humans, not only those close to the place they live, but also in other places on the planet; and not only those who exist today but also future generations are implicated; as well as being situated in a network of non-human objects, which form the technological fabric that surrounds us, as well as other non-human living beings that surround us and relate to us, in our natural environment. In this sense, human agency is more than human, it is not simply reduced to a conscious subjective dimension but extends materially and biologically to other non-human beings with which we are relationally constituted – in this sense, we are, in the end, hybrid entities, made up of material and digital artifacts and objects, human and non-human organisms, in which nature and culture are not dissociated. As Santaella (2021, p. 90) warns, it seems that

[...] the modern mind has become a hybrid structure, built from traces of previous biological stages together with symbolic resources from external memory, today made up of a plurality of systems of signs produced thanks to increasingly sophisticated and intelligent technologies. Ultimately, it seems that the evolution of the human mind is moving towards tuning into the environment on multiple levels, with multi-level tuners. It remains to be seen whether humans are up to the evolution of their hybrid mind.

Technological mediation in human life plays a very important role, as we have seen, in the set of social practices and, consequently, in the configuration of human agency, beyond the mere instrumentality assumed by common sense. As Don Ihde maintains

¹¹ The expression “Advanced capitalism” describes “a harmonious and self-regulating economic system, a society in which individual freedom defines wider economic freedom or a capitalist model has been integrated and developed deeply and extensively and for a prolonged period in a freedom-based culture. The expression *advanced capitalism* distinguishes such societies from the historical previous forms of capitalism, mercantilism, and industrial capitalism, and partially overlaps with the concepts of a developed country; of the post-industrial age; of finance capitalism; of post-Fordism; of the spectacular society; of media culture; and of “developed”, “modern”, and “complex” capitalism, all variants of economic freedom”. See “Advanced capitalism”. *Wikipedia*. Access on 24.04.2024. <https://en.wikipedia.org/wiki/Advanced_capitalism>

¹² “Cyberspace is an interconnected digital environment. It is a type of virtual world popularized with the rise of the Internet. The term entered popular culture from science fiction and the arts but is now used by technology strategists, security professionals, governments, military and industry leaders, and entrepreneurs to describe the domain of the global technology environment, commonly defined as standing for the global network of interdependent information technology infrastructures, telecommunications networks and computer processing systems”. *Wikipedia*. Access on 24.04.2024. <<https://en.wikipedia.org/wiki/Cyberspace>>.

[...] our existence is *technologically textured*, not only with respect to the large dramatic and critical issues which arise in a high technological civilization – such as the threat of nuclear war or the worry over global pollution, with its possibly irreversible effects – but also with respect to the rhythms and spaces of daily life (IHDE, 1990, p. 1).

According to him, from the moment we wake up we are in human-technology interactions that scale numerically from the simplest to the most complex, intertwined with technological artifacts that mediate and establish possibilities in our daily lives. This applies from the blanket we use to sleep to the means of transportation we use to get to work, and even in our attempts to escape from these relationships with material and urban culture through, for example, mountain climbing or water skiing, as well like our sexual practices with condoms and other protectives. This extent and variety of the incorporation of technologies into our daily lives produces a familiarity that can distance us from the need for critical reflection on their results, as well as on the impacts that this technologically incorporated system has on our lives, a system that he calls “technosystem”¹³.

Ihde’s reflection proposes precisely to break this familiarity that blinds us and realize the peculiarity of this technologically embodied form of life, bringing to light the wide variety of existential questions and popular and academic beliefs involved in it. When articulating the vast and complex terrain of technology with its human context, Ihde prefers the Kierkegaardian maritime metaphor of *Fear and Trembling*, according to which we would be like captains of ships sailing through the seas, in which “the navigator, in the very midst of the sea where both boat and sea are in motion, must take bearings, find a direction, and locate both himself and his destination” (IHDE, [1990] 2017, p. 27). In other words, we are already inhabiting a technosphere, a technological cocoon that provides us with life support, an environment built with our participation and technological artifacts, of which we are self-aware and in which we need to locate the points of reference, based on the variations of this environment, to find our way – in the language of Macintyre, to find our flourishing as humans.

With the constitutive participation of technologies in his actions, as part of a technosphere, the technologically mediated human agent ceases to be simply an autonomous subject, an imposing lord of technological artifacts made available at hand for his use and disuse, he is immersed and configured in the interworld of technological mediations, being at the same time as an agent that produces technologies, and, on the other hand, also dialectically reconfigured by them, suffering their determination. Technological artifacts lose the common status of mere tools external to the human agency to become constituents of the possibilities of action of human agents and, therefore, shapers of the moral and social community¹⁴.

The concept of technical mediation was formulated by Bruno Latour (1994) to explain how technology is modifying humans, when they delegate their actions to technological artifacts, through their embedded scripts or executables that direct the action. An example of this is speed bumps on roads and streets that force drivers to reduce speed and, therefore, behave morally in an appropriate and valuable way. And Peter-Paul Verbeek (2005, 2011) advances it to account for how human existence is always intertwined with technology, how technologies and humans exist together and acquire their characteristics from their mutual dependencies. The perception of the world, how the world appears to humans, and the action in the world, how men act in the world, are always constituted and transformed by technologies to a greater or lesser extent, so we must pay more careful attention to how concrete technologies actions

¹³ Feenberg (2017) also assumes this systemic perception of technologies in social life.

¹⁴ On this, see, for instance, Latour (1994, 2002, 2012), Ihde (1990) and Verbeek (2011).

take place in the human world. In this sense, technological artifacts become contiguous with humans and their actions, they begin to configure men's actions and quality, in an intertwining between humans and technological devices.

Humans are technological beings, just as technologies are social entities. Technologies, after all, play a constitutive role in our daily lives. They help to shape our actions and experiences, they inform our moral decisions, and they affect the quality of our lives. When technologies are used, they inevitably help to shape the context in which they function. They help specific relations between human beings and reality to come about and co-shape new practices and ways of living (VERBEEK, 2011, p. 4).

Moral agency is not left out of this process because the possibilities of action and the very human condition of the moral subject also become configured with the consistent participation of technological artifacts. A recurring example given by Verbeek (2011) is the fetal ultrasound, in medicine, whose existence changes the condition of the baby and parents in relation to that condition which previously existed without this technological device. The ultrasound transforms the relationship that parents have with the fetus, by making them responsible for the possibility of maintaining the continuity of its existence in the event of the detection of a serious illness; it inserts the fetus into the relationship with its parents well before birth, by providing it with a technologically mediated identity; transforms the fetus into an object of medical care, something that did not exist before ultrasound, subjecting it to decision-making by parents and doctors. In short, it is a technological device configuring the morality of parents' relationships with the fetus in a new way, something that did not exist before the emergence of the medical test in the human world, causing them to have to make moral decisions that were previously not possible. A new world of possibilities opens up with technological mediation, which would be impossible without the participation of these technical artifacts.

In this sense, what is human cannot be dissociated from technological artifacts and their dialectical mediations on human agency and the constitution of the collective space itself shared by humans and non-humans, whether the latter are technological artifacts or biological entities. What is morally correct or represents human flourishing in terms of excellence is not dissociated from the material, virtual, and symbolic possibilities opened by technological design, as this in its multiplicity advocates possible futures of the world and humanity that cannot be reduced to only one historical, social and political possibility. Due to its relational and non-unitary condition, technological design(s) bring with them different *becomings* that cannot be reduced only to those that digital capitalism makes possible in the present. There are internal powers of technological design that express the powers of human agency in moral and political terms, as this is not ontologically ready and finished, but has an inherent historicity. More than human powers, since there are no humans without the effective and material mediation of non-humans in our practices, whether these are technological objects or natural entities¹⁵.

In the same reflective line, when Andrew Feenberg (2017) asks about the possibility of changing the *technosystem* towards the democratization of society, he is not advocating that the existing technological apparatus be redirected towards another possibility, other differentiated purposes, as if this apparatus was a piece of furniture to be relocated because it is eventually out of the way, from the perspective of that common human instrumentalism. It is, on the contrary, a perspective of changing design patterns to configure another form of sociability that represents full human flourishing, a form of social life that carries an emancipatory rationa-

¹⁵ About this symbiosis between humans and technology, see also Santaella (2022).

lity, not limited to the forms of rationality currently in force and technologically subjected to the interests of transnational and digital capitalism. Democratizing technology, in the sense assumed by Feenberg, is not the mere socialization of currently consumed technological gadgets but generating another horizon of technological mediation in the forms of societal life in which human powers of flourishing, as well as the horizon of human agency as a whole, come to exist in the form of an emancipated historical becoming, not permeated by social, economic and political class domination.

Thus, to democratize technologies is to democratize the dominant technical code, it is to make technological design, as a fundamental social practice in the ordering and configuration of the social, economic and political life of humans, pose the question of its moral and political ends, transforming human agency towards a socially just and equitable society. And, therefore, place the political struggle within the technical code itself, that is, in the dispute for the standard of technological design, for the value horizon that is intrinsic to it, for the ends that provide its direction, the *telos* for the development of artifacts and their experiences of humanity and possible futures, in short, about living well. As Verbeek (2005, p. 235-236) remembers,

The design of technology thereby becomes no longer an internal technological affair, but appears to be a moral matter as well. Technologies are not merely functional objects that also have dimensions of style and meaning; they mediate the relations between human beings and their world, and thereby shape human experiences and existence. Technologies help to determine how people act, so that it is not only people but also things who give answers to the classical moral question, "How to live?" It is time that we take the contributions of technology seriously and combine our forces to provide new answers to this ancient question that still applies to the technological world in which we live.

Towards a praxeological technological design

Thinking of technologies as neutral instruments and tools available to our agency is, as we have seen, obscuring their complex nature, and wanting to impose an ideologically interested vision on technological design. On the contrary, when we assume them as a social practice carrying internal and external ends and values, we do not understand them outside the social fabric of which they are part, therefore, carrying ethical and political constituent elements with them, we rehumanize them. We return it to its condition of legitimate human praxis and a constitutive part of the discussion around the building and embodying of human flourishing since we cannot think of human agency without these technological artifacts, without this cocoon that constitutes and expresses us, in other words, they are carriers of our humanity and praxis.

In this sense, it means going beyond an instrumentalist conception that ends up limiting our understanding of its centrality in the construction of human life, by making technological design an inevitable one-sidedness, governed by progress directed by the universal *telos* of efficiency. Understanding it as practice, in Macintyre's sense that we proposed, we return its historicity to all human praxis, and we are not trapped in a pessimistic view of the intensive presence of technology in the world of life. Concrete experiences of how technology is not deterministic of human actions, such as those related to the environmental movement and the internet, are an illustration of what human agency can do with the technology that permeates the world of life, even in advanced capitalist societies where the potential for alienation is always pervasive and constitutive of this way of producing social life.

In its role of configuring determined mediations between humans, technological design puts at stake an ought to be of humanity and the world, as far as the powers mobilized by tech-

nologies are not restricted to the human space of the city, but reach the entire planet, the whole nature. This technological human agency is, therefore, what is most genuine in human praxis, its creative capacity, and its historicity, establishing ends not only as individuals but as species. It is through the practice of technological design that we build our conception of humanity, what constitutes our good life. Our contemporary challenge is precisely to fully realize and understand this as a species that asks itself the question about the meaning of being, about human excellence and flourishing not dissociated from the non-humans that also constitute us.

Leaving the instrumentalist conception of technological design is necessary to climb the path of reciprocal generosity with non-human organisms and mutuality with the technical artifacts that form our cocoon, our technosphere, as well as with the reciprocity and social cooperation that is inherent in the social fabric. And recognizing the relational rationality that is ontologically specific to our way of being and acting in the world together with others, as well as the technical objects that define us, in other words, by a praxeological technological design in the MacIntyrean sense. As our agency can no longer be thought of as being outside of technological mediation, the reflection on normativity in the technologically mediated actional context cannot be refused, under the penalty of maintaining a partial and mistaken perspective of the merely instrumental *démarche* of technology. Such normativity, in turn, is always the crystallization of a social consensus, configured in the form of some social tradition of thought, practices, and technological artifacts, which is always historically transforming itself. As Ihde and Jonas observed, the normativity required for a technological civilization is not outside the culture that expresses it but will necessarily have to go through its material and symbolic relationality, from artifacts to the image of humanity, at its most different levels.

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About the author

Helder Buenos Aires de Carvalho

Full Professor, Philosophy Department/UFPI. Researcher PQ2/CNPq. Professor in the Graduate Program of Philosophy, UFPI. PhD in Philosophy (UFMG, 2004), with a doctoral internship at Boston College (2001). Postdoctoral Research in PUCRS (2010) and UFMG (2018).

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