

THINKING OF (THE THEORY OF) EDUCATION FROM THE TECHNOLOGY OF OUR TIME¹

*Pensar la (teoría de la) educación, desde la tecnología
de nuestro tiempo*

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ABSTRACT

In (theory of) education we must address one question as soon as possible: how to create and think of education in keeping with the characteristics, demands and opportunities of this digital age? In this regard, after referring to the paths pedagogical research and educational practice have been following in this field, three questions are raised in the body of the article—ways of being, of experiencing the world and of creating knowledge of a subject whose relationship with the environment is mediated by a technology whose defining feature comes from a digital screen—which are demanding a new way of looking at education. In other words, three issues directly affected by the new scenario created by these technologies and which a (theory of) education of our times cannot ignore as that would amount to not (wanting) to see the transition occurring in ways of thinking and putting education into practice; the (theory of) education in our digital time somehow rests on or revolves around them.

The article ends with a range of diverse, closely intertwined questions: epistemological, ontological, methodological, but also ethical and political, which give us a glimpse of the advisability or need to redirect thought in this field while forming a research programme; questions with sufficient potential to redirect (theory of) education research, including the very concept and meaning of educating and being educated.

Key words: digital screens; reontologisation of reality; self-perception and construction; building digital knowledge; digital environments and grammar.

RESUMEN

En (teoría de la) educación necesitamos abordar cuanto antes una pregunta: cómo hacer y pensar la educación en consonancia con las características, exigencias y oportunidades, de esta época digital. A este respecto, después de referenciar los derroteros que en este campo viene siguiendo la investigación pedagógica y la práctica educativa, se plantean en el cuerpo del artículo tres cuestiones —modos de ser, de experimentar el mundo y de construir conocimiento en un sujeto cuya relación con el entorno es mediada por una tecnología cuyo rasgo definitorio viene dado por una pantalla digital— que están demandando otra forma de ver la educación, dicho de otra manera, tres cuestiones directamente afectadas por el nuevo escenario creado por estas tecnologías y que una (teoría de la) educación de nuestro tiempo no puede ignorar, pues sería tanto como no (querer) ver la transición que se está produciendo en las formas de pensar y hacer educación; de alguna manera, sobre ellas descansa y pivota una (teoría de la) educación acorde con este nuestro tiempo digital.

El artículo termina con un elenco de preguntas de orden diverso, epistemológico, ontológico y metodológico, pero también ético y político, estrechamente entrelazadas, que dejan entrever la conveniencia y necesidad de reorientar la reflexión en este campo, al tiempo que conforman un programa de investigación; preguntas con potencialidad suficiente para reorientar la investigación en (teoría de la) educación, incluido el propio concepto y sentido de educar y ser educado.

Palabras clave: pantallas digitales; reontologización de la realidad; percepción y construcción del yo; construcción digital de conocimiento; entornos y gramáticas digitales.

1. INTRODUCTION

Some time ago we said that these technologies, which soon became known as information and communication because this is basically what they were at the beginning, while providing education with a good number of possibilities and opportunities, also raised some requirements and demands for pedagogy; we are referring to the advisability, and even the need, to think of education, agents, spaces and training processes, among others, in another way (García del Dujo & Martín-García, 2002; 2005).

However, pedagogical research and educational practice in this field have not followed these paths; on the contrary, in both cases, research and practice, as well as educational innovation programmes, the same movement, direction and conception of this technology has prevailed, implemented in two ways: on one hand, a linear transposition of traditional practices to new spaces generated by these technologies accepting as a matter of principle, and without further questioning, that these technologies reproduce the spaces, agents and processes of traditional thinking; and, on the other, there has been an attempt to integrate these technologies in traditional spaces as another tool to serve traditional training spaces, agents and processes, without realising that introducing a new component in an ecosystem changes how the system behaves, especially if this new element comes from a different technology. The order in which this dual movement has taken place over time was first the instrumental consideration of these technologies at the services of current teaching approaches and, secondly, the literal transfer of the traditional perspective of the teaching-learning process to a virtual space.

Both moments and interpretations converge in an instrumental, scholarly and didactic, instructional, individualistic conception of these technologies; a conception that reduces their enormous educational potential to simple tools for producing, storing, transferring and managing information and communication, whose culmination and best reflection in the field of education has probably come to light during the confinement caused by this pandemic; a clearly insufficient and improvable conception, as shown by the level of dissatisfaction that training processes approached in this way have generated in teachers and students during these troubled times, notwithstanding that we must recognise that the scenario would have been worse without this technology. Of course!

This approach can be seen with a glance at any of the numerous scientific journals publishing work on this conception as media, many of which emerged at the time and under the umbrella of these technologies and have evolved their themes at the generational pace they have been marking, so that today we have vast literature on a technology that is progressively showing its educational potential, even though pedagogy reinterprets it, time and time again, always in the same

direction, whether as media subject to comparative analysis with other media; as media that arouses certain attitudes in users, whether teachers or learners; as media that requires certain skills; as uniform-format media with multidisciplinary or diverse validity depending on the characteristics of each technology more than on pedagogical requirements... (Cabero, 2016). At most, educational design has opened up to and accepted principles of collaboration, cooperation,... and other methodological aspects in line with the updated versions of the Vygotskian principle of activity, now mediated by this technology, and of the socio-constructivist principles reformulated in successive generations.

Therefore, we could think that this way of interpreting and using technology continues to lead us to think of and practice education from a modern (traditional) conception of teaching and learning, a scholar conception of education, no matter how much the tools typical of postmodern society come into play. The mental diagram of education implicit there continues to respond to a way of understanding reality inherent to modernity, as if this technology had not changed how we see, do and think that reality including, of course, how we think of and practice education.

There is, however, another possible way of interpreting this technology that is of more interest to the theory of education. This other reading rests on considering technology as culture, in the sense that it creates ways of thinking, seeing, acting,—in other words, ways of living and different worlds of life—insofar as it changes ways of relating with things and others, eventually also changing how we perceive and create realities, including our own identity and that of the things in the world. In this dual sense—things and technology—various authors speak of a process of reontologisation of reality catalysed by the technologies of our time (Floridi, 2014 and Vlieghe, 2019, although they do so in a different sense). And in keeping with this other approach, we could think—what's more, we should think—that education can and must also be affected, but not only in the sense that we can achieve it in another way, with other means, but in the sense of its very interpretation and conception.

In this article we propose reflecting on these three issues that are demanding this other way of viewing education or, in other words, three issues directly affected by the new scenario created by these technologies and which a (theory of) education of our time cannot ignore as this would be like not (wanting) to see the transition occurring in ways of thinking and practicing education, including the very concept of education; issues which refer to educational components—means of perception, spaces, practices and relations, agents and processes of building knowledge—which, contributed or catalysed by this technology, are calling for a global redefinition of education. And we will end with a range of points that specify this other way of seeing (theory of) education, even if they are in the form of questions.

2. A SCREEN-BASED EXPERIENCE OF OUR WORLD- THE EXPERIENCE OF LOOKING AT THE WORLD THROUGH A SCREEN...

In this section, the ontological implications of the shift towards digital education are drawn out. It will be argued that, when we increasingly rely on digital devices, and more exactly when the world is disclosed via screens, there is something new and unique about relating to reality. This, in turn, has severe implications for how we educate and how we should theorize education in the 21st century.

It goes without saying that the phenomenon of digitization in education (and other spheres of life) can be analysed from many different angles. An example of this is the profound alteration in what it means to relate to knowledge, where it can be claimed that we have finally freed ourselves from the useless cramming of details and facts, as information is available always and everywhere, but also that we no longer process knowledge at a deep enough level to make significant changes to our lives. Another example would be drawing attention to the new possibilities and limitations pertaining to the social aspects of life. With the massive use of digital tools it has become physically possible to be a part of collectives that expand beyond any dimension of sociality humankind has known thus far (in view of what Robin Dunbar —2010— claims to be the maximal capacity of the number of people with whom we can connect to form a true ‘group’ — a figure of around 150, based on his study of primate life-forms, the seize of the Neolithic town, the basic units of the Ancient Roman army, etc.). But again, the same fact can be critically approached, building the argument that this comes with new forms of tribalism, where everyone is constantly exposed to the other’s gaze and is continuously expected to share content and reply to what others post on-line, bringing about the end of the Modern mindset (which is through and through anti-tribalist, as it is aimed at isolating and emancipating the individual from the group, with the aid of political, urbanist and above all educational means; See Fogel and Patino, 2013).

Now, in what follows digitization will be approached from a specific, threefold point-of-view. First and contrary to the two examples just offered, the aim is not to develop a normative position (i.e. that we should or should not welcome digitization). Digitalization will be simply taken to be the condition under which we live and educate today. This requires that the consequences of such a shift in conditions are carefully drawn out. But, conforming to the two examples just discussed, this article takes for granted that the introduction of new media has far-reaching effects on how (human) reality is structured: it comes with profound ontological changes (e.g., it transmogrifies the very essence of what a *real* collective can be).

Secondly, in the following this point-of-view is taken a step further in that it will be claimed that digitization amounts to rearranging our understanding of reality *as such*. The change discussed in this section concerns more than an alteration of

ontologically relevant structures: what is at stake is that in a digital world that what counts as real gets completely modified. To be more precise, under digital conditions reality is experienced as fully immanent (Vlieghe, 2019). To substantiate such a claim, it is important, thirdly, to approach the digital from one specific angle, viz. that the world increasingly appears to us on a screen. We live in a world where screens have become omnipresent, to such an extent that for the new generation it has almost become unthinkable to disclose the world they live in without the mediation of the screen (Tisseron, 2010). Hence, it is of the utmost importance to understand how reality surfaces on the flat and rectangularly framed screen of our digital contrivances, which are increasingly hand-held devices.

When we approach this question using a modernist understanding of aesthetical technologies (like drawings and paintings), i.e. when we would define the screen as a window that gives access to the world behind it, we might be profoundly mistaken — even though this imagery has been most influential since the Renaissance and particularly due to Alberti's discussion of it in *De Pictura* (1435). This, at least, is argued by Mauro Carbone who defines window and screen as two opposed metaphysical devices (Carbone 2013). The window, indeed, transports us from the sphere of the 'here' to another realm 'over there'. The screen, on the contrary, which when turned off isn't by accident also a mirror, throws us back onto ourselves. This is all the more the case when we look at the screen of our smartphones: we are not gazing through our hand into a sphere beyond it. Instead, we have an experience of our visual and tactile senses fusing in the very palm of our hand. What we see coincides with what we feel to be capturing in our hand. That is why Heidi Cooley (2004) correctly identifies this experience in terms of 'tactile vision'.

Now, all, this comes with a particular reality-effect. This is: that what we see, and thus also haptically feel appear on the screen counts as equally real (or even more real) as the world accessed in another manner. This explains the difficulty many have not to look at a screen when it is present, or why we can visit a museum solely with the goal of capturing pictures of the objects of interest to be encountered there. Whereas, in pre-digital times, photography was an instrument to represent objects in their physical absence, where the medium (the camera) was but a means to create an image that exists in independence from this means (printed photographs), today we can make (produce) and watch (consume) images with one and the same device, with the main aim to have them captured in our hand-held device. We want them to be present-at-hand in the most absolute sense of that word (whereas printed images have become meaningless). In French this reads: we want reality to be '*main-tenant*' (meaning both 'now' and 'contained-in-my-hand'; Serres, 2012). We are only interested in what we can experience here and now, in the palm of our hand. And, importantly, this means that instead of craving for a reality outside or out there (as was the case in the modern apparatus of the window), we want

to relate to the world in a fully immanent way. The only reality that counts is the radically here and now — the *'Maintenant'*. The same analysis, it could be argued, applies to all screens, hand-held and fixed ones, digital screens and non-digital screens. The screens of our digital devices are then to be considered as the most perfect expression of the essence of 'screenness' that was only partially realized in older screen formats (See Introna & Ilharco, 2006; Vlieghe, 2019).

Now, our new ontological condition of *'Maintenant'*, resulting from relating to the world on-screen, can be further elucidated, by turning to its premodern origins. Indeed, it is in Roman antiquity that we can find the origin of the framework that we call a screen today: going against the more popular account that the screen operates in the way the window does, and questioning that this would explain for the fact that screens with a few exceptions are rectangular, Anna Caterina Dalmasso (2020) argues that screens originate from within the practice of augury: the priest, called upon to predict the future, had to perform the *templum* gesture, i.e. using his thumbs and index fingers to form four straight angles that circumscribed a rectangular field within which the flight of the birds had to be observed and studied. A particular part of the skies had to be circumscribed, so as to be able to read the signs that could tell the Romans about their fate.

Importantly, this way of telling the future could be seen as a great step forward with regards to former divinatory practices: whereas the Romans used to rely on the always subjective and risky interpretation of inconclusive signs, and especially equivocal and arcane oracle predictions, with the advent of augury divination became more objective. This is because there is a never bridgeable gap between what the oracle priest throws out and the events that will happen in the future. On the contrary, it was believed that there was a direct and immanent connection between the flights of birds and future events, because both were causally tight in with the causal order of nature. In that sense, augury was more objective, and a first step towards what we would call a scientific worldview today. But, more importantly in the context of this article, Dalmasso suggests that the *templum* is a dispositive that allows for a particular way of looking at the world which is immanent through and through (and which was forgotten or repressed, Dalmasso implies, because since Modernity we have started to think in terms of *'the window'* as the dominant dispositive to represent the world).

Furthermore, living under conditions of a radical *'Maintenant'* also comes with a restructuring of our experience of what it means to be situated in time, i.e. what time is all about. Again, it is helpful to oppose a modernist way of looking to what occurs when the digital screen has become ubiquitous. In line with the modern window metaphor, tied up with the activity of looking through, i.e. forwards, it could be said that the time-experience we got used to have is one of forwardness. Against the background of a modern ideology of progress, we were accustomed to

posit ourselves on a line stretching from a bygone past to a not-yet present (and hopefully brighter) future. Hence, the past is literally what lies behind us, whilst the future is the dimension that lies ahead. The future is that what we face. But, when the world is disclosed through the screen, what we face is no longer the future. The content that appears on the screen is either present (as in live streaming) or past, as is mostly the case (viz. contents developed and designed before we lay our eyes on them). The screen-user has so to speak left behind any orientation to the future and in that sense the future lies behind him or her; instead, what lies before him or her is the present and that was has already been present — the past (See Fogel & Patino, 2013). As a result, we end up with a completely different ontological experience of time that, conforming to our analysis thus far, should be called utterly immanent. No relation to a dimension outside or beyond the here and now is required to perceive things as relevant and meaningful, and above all as real.

Referring to the reflections of Vilém Flusser (2011) regarding digital media, this new way of experiencing time could also be called '*post-historical*'. Flusser argues that it was of the utmost importance of those living under modern, i.e. predigital, conditions to situate themselves in — and find a firm ground in — history: we needed to know where we stand in time, in which epoch we live, what eras we have left behind and what we can reasonably expect to happen in the future. Now, in a fully digitized world such a view has lost all meaning. Situating ourselves as positioned within a historical trajectory no longer allows us to give direction to our dealings with the world. What counts is, again, just the here and the now.

Interestingly, for Flusser the historical way of relating to the world is hooked up with another major metaphor of modernity (next to the window): the book. We read books from cover to cover, engaging in long periods of sustained concentration, and we read them in a progressive order — feeling manually how we progress through them as a result of the unequally divided pressure to be perceived in our left and right hands. The practice of reading thus supports a future and progress oriented time-experience. Now, the book could also be called the '*Leitmedium*' of Modern education, as Jeanette Böhme (2006) suggests. The beginning of Modernity also coincides with the invention and rapid proliferation of printed texts, forcing upon society a large-scale programme of instructing youngsters how to read and write, which we now call school education. In an age of the book, being illiterate is as burdensome as being bereft of sight and hearing — the point being that an education that is up to its age is concerned with taking care of initiating the new generation into the culturally dominant medium to access the world, i.e. the '*Leitmedium*' (cf. Stiegler, 2008). Likewise, in an age where we have to deal with the education of 'screenagers', we would be well advised to take into account that we face a new dominant technology of world-disclosure, and even one that frames reality itself in completely different ways than it used to be.

This involves, more concretely, two things. First, that we take seriously that core educational concepts have fundamentally changed and that they shouldn't be judged against bygone, pre-digital standards. To give but one illustration: the notion of *creativity* gains a completely different meaning in view of what has been said above. When we ask students to compose an essay for instance, we may want to welcome work that isn't a mere 'classical' written research report, but that consists of selecting, rehashing, entangling and reworking existing digital materials. And we might want to validate it as original, meaning that we have to redefine another important ontological notion, viz. newness. Secondly, if we are faced with a new educational 'Leitmedium', this also implies that we want to gain proficiency in using the new digital technology, as well as to be able to relate to it critically. This would come with a change in curriculum which focuses on what could be called a spelling and grammar of the digital.

3. YOU, I AND THINGS, IN VIRTUAL SPACES – ..., OF LOOKING AT OURSELVES LOOKING AT THE WORLD THROUGH A SCREEN...

You and I, in terms of a reality that we are, are also subject to transfiguration processes when we look at the world and inhabit these screens. We will recall on one hand that all technology, in the sense of culture we are interested in here, entails a certain redefinition of the ways I am and how I think, how we relate to others, to the environment and to ourselves because the mechanisms through which I see the things around me, I do and change those things, use or simply disregard them are reconfigured, involving processes of adapting to the new cultural environment, of building and rebuilding individual and social identity, and intersubjectivity processes in which we humans create ourselves. New cultural events that raise questions of educational interest: How ways of thinking about me and others, of seeing and doing things are affected, altered, recomposed by our technology? To what extent processes of autonomy, self-regulation and responsibility, emotion and affection, critical thinking, relating and socialisation, require rethinking in light of predominant technology in this era?

On the other, reading today's technology and the virtual environments it generates from an educational perspective suggests we should observe and interpret what happens there in a human way, the life tasks that take place there. Reading in one's own face and that of others the things between them and the surrounding environment to discover traces of humanisation, of vital necessity, as a basis for education. No great technical experience is required to note that on social media, online games, virtual platforms, there is life, affections and emotions, and things, cultural devices that promote human development and, above all, people who activate and experience development processes. Therefore, we must reread this from

the sense of raising the question of human condition in technology, identifying the limits and possibilities of this development in, with and from that technology as the implicit intention is to discover vital need as a catalyst for the educational processes that make up the human being, however complex and strange it may seem when often observing, rather than humanisation processes, dehumanisation processes originating in ephemeral, discontinuous, fleeting relationships.

So, according to these premises, we could state the starting point in this heading in the following terms: human nature—which is also culture—and culture converge, need and reconfigure each other when life scenarios are mediated by technology, regardless of the reference technology and, therefore, from a conception of culture as a primary process and from that inseparable reality of the human species, nature and culture at the same time, some of this must also happen in virtual scenarios. In this sense, research has shown that, beyond the specific technological device, elements are intertwined and experiences shaped on the internet that are visualised through activity, action and relationship patterns (Pangrazio, 2019). Sites are generated, which are transformed into places, things are exchanged, feelings expressed, values conveyed, although always based on information; there is life, with social communities and things around these communities which catalyse processes of building individual and collective identities, making them dynamic and visible. So, just as there is a reontologisation of reality looking through screens, which entails a major redefinition, including spatial and time dimensions, there are also processes of building and rebuilding identities that must be understood and addressed from education. Let's take it in steps.

Let's look at the self and intra-subjective processes. The subject looks at themselves, listens to themselves, perceives themselves in their own images, makes themselves heard by talking to themselves through the multiple profiles they can show online, all of which conforms processing the personal experience shown in terms of particular grammar, represented by the places chosen, images shared, likes shown or sites avoided, and typical digital grammar that conditions how I and you are conformed. It is the narrative of disclosure-privacy-intimacy; depending on the where and when, the subject manages their self, their disclosure and/or privacy one way or another, using one or another profile in the search for building their self, the privacy and even the intimacy they want (Schofield & Kupiainen, 2015). The problem comes when one of the self's sites behaves and presents a different profile than others (Greenfield, 2014). In offline life, the concern was what aspects of our life we decided were intimate; now, in online life, the challenge is what to do to achieve this once we have decided, as intimacy is reconceptualised. Moreover, we can lie about our personal identity, change name, age, race, present an imaginary self. The transversality and multi-ramification of the internet allows us to show different selves which, in turn, help the individual to satisfy needs and desires that could never have intentionally

been fulfilled in face-to-face environments. Thus, managing one's own visibility is managing the process of building the self, a process that allows us to show different identities and combine them depending on the site and time we are showing ourselves. Several and complex identity processes are activated by relying on image, which is not always the desired or real one, with the risk of even damaging it as it is not usually shown from unity, but rather than from fragmentation, discontinuity, leading to unwanted situations (Memon *et al.*, 2018), especially when it often does not respond to a conscious intention but rather an uncontrolled compulsion.

Technology as culture is life, it diversifies and expands, but also sometimes complicates it, creating dependencies that lead to ontological insecurities attached to fragile, contingent and uncertain lives lacking reflection and critical thinking, aspects which form part of the argumentation on the digital non-native nature of young people is based, all of which points to the need to implement educational processes geared towards self-reflection, not only self-expression (Mace, 2020).

Now let's look at the you, others, inter-subjective processes. The digital human needs a you to verify that they are and exist online, to reaffirm who they really are, to accept themselves and understand what is happening to them, what they are doing and feeling. The internet not only allows them to be heard and feel accompanied, but it modifies them from a group position, how they are in a group—also a consequence of overlapping networks—, and thus the subject acquires autonomy and reflection from individual behaviours online, although collectivity also marks the self-regulation process as technology, understood as culture, is basically social. They are not only tools to be used, but technically devised sites for creating social communications, sites that become places with actions, feelings, games, thus generating other sites and places; therein lies the importance and need to not forget in any reflection on educational perspective, the limits set by digital grammar, the anatomy and physiology of digital, and that end up shaping identities and behaviours.

Observing offline life we perceive negotiation processes of feelings of collective identification in groups, which means leaving the self and reaffirming its immanence in a position of equals, collective, whose social representation is described by the search for agreements, relationships and subordinations of different types regarding others, as shown by their capacity for social expression. Manifestations that are visible in the form of gestures, looks, comments, photos, landscapes and a long etcetera of social representation, and that shape and confirm the social self online. This is how the environment becomes a symbolic social territory where graphism and shared image are the central components of communication and relationship processes activated and developed through hypertextual, never linear, visual looks and readings, and which lead to constant deterritorialisation and reterritorialisation processes. It is what Goffman (2001) called managing impressions that the self wants to capture from the you, building in this case a network of relationships

that exceeds what has been established institutionally and socially, generating peer aggregation mechanisms in certain environments and sometimes other environments, from negotiating a permanent collective identity. The idea of a common online collective which shares ideas, attributes, hobbies, interests, possible by acquiring a sense of sharing life with you; the criteria of social limits are extended, narrowed and diversified, rebuilding the self with many others in different and heterogeneous areas of social life.

Now, here again, as in intra-subjective processes, there is a risk of finding superficiality in the relationship, replacing basic socialisation processes with others more linked to fiction, associated with social isolation more than sociability. Research in this area even talks of social saturation to which one is permanently subjected, the result of extended relationships proportionally associated with the real disconnection of the other (Costa, 2018); here we can detect a niche of opportunities for developing basic education associated with processes of adapting to the new technocultural medium and environment.

And, finally, we observe the whole, the you, the self and things: vital interdependence processes associated with actions between groups with the things done, used, built and consumed in those groups. Literature in this regard shows interest in highlighting the nature of the digital subject as a sower and harvester, producer and consumer of things—devices, games, publications, comments, images, ideas, responses, relationships, information, etc.—(Sánchez Chamorro *et al.*, 2020), in short, stories that finally build the self from unity and stability. The relationship, communication, affections manifested acquire full meaning in immediacy when they are mediated by the technoculture in which they are inserted, by the things—associated with environments—with which they coexist and give unity to the community from a three-part dialogue.

They are the things that end up making the space and time appealing, the place and moment chosen to enter and remain on the internet. That which allows the self and you to feel, project, act..., to be, from dialogue with the moment and with the things in the environment. The logic and value of what is shared is not generated and only affect the self and you, it is not only social for the social, but dialogue between the things seen, done, created, consumed comes into play with an especially important role. A dialogue online that is rather occasional, attached to belonging to places, moments, technocultural landscapes we experience and share (Côté & Levine, 2002); solitude understood backwards, shared, amplified, even if it is only you looking out the window.

If reliving the places that marked our childhood is necessary, for example, because there were not only people but also things that need to be seen and enjoyed again, it is no less true that virtual spaces also enable this reminiscence of things, built and shared, that at one time shaped our identity. Readings, places, landscapes,

sports, games, hobbies and tastes that speak of human ties, not always visible nor easy to find, but always there. It is a new concept of public space where the things I do and share allow me to talk about my everyday life and routines in the new streets and new neighbourhoods (Humphreys *et al.*, 2013).

And here again we find limits and opportunities for education, as things are not always cared for and valued, rather they are used ephemerally and discarded, they are not taken in, they are not cultivated. And the world of the subject's life thus also becomes an ephemeral, discontinuous, liquid world, a world without stable relationships, of transitory evanescent, easily mutable forms which warns us, as in the previous processes, of the relevance of reconceptualising education to think about it from the need to adjust times and spaces, the worlds of on and offline life; this is the concept of onlife experience, life and identity (Floridi, 2014), an ontological change that must start by unlearning what technology has been imposing since its beginnings: living quickly, without the possibility of putting time on our side, without being able to settle in time. Creating and thinking of the (theory of) education of our technocultural world also requires us to recover times and spaces as educational variables, reviewing them.

4. BUILDING KNOWLEDGE IN VIRTUAL SPACES – ...AND OF BUILDING KNOWLEDGE BY LOOKING THROUGH A SCREEN

The ways of reontologising reality and experiencing the world through screens and processes of building and rebuilding the identity of subjects, when they see and look at themselves on those screens, must have—we would like to think almost necessarily—their complement in ways and processes of self-knowledge, characteristic and probably different in some sense, from these virtual environments; that is precisely one of the lines of research in which we have placed most expectations. If introducing devices and tools in human activity has brought changes in the ways of generating knowledge throughout history, we cannot expect less of this digital technology; on the contrary, given the peculiarities of this technological (r)evolution we are witnessing and have been highlighting from the outset. In summary, a technology that is transforming the intrinsic nature of our world and reconfiguring our ways of living and acting in physical and virtual (*onlife*) spaces cannot but also affect knowledge-building processes.

In previous sections we have indicated, directly and indirectly, some of the components of educational action affected by the reontologisation we have been referring to as a catalyst of various subject reconfiguration processes: relationship practices and forms, devices, spaces and agents involved. All components involved in knowledge-building processes and which precisely make up the props for the framework of the socioconstructivist or Vygotskian current (Ali, Joyes, & Ellison,

2015; Daniels, 2003), which support the theories that have attempted to explain how knowledge is generated in a way that is consistent with the reality and technology of the moment. A series of approaches that coincide in that learning cannot be understood outside its context and, consequently, postulates have focused on overcoming the contextual, cultural, artifactual, historical and social limitations of the time. However, despite attempts to adapt the socioconstructivist approach to current reality, results obtained by research do not appear to be sufficiently robust to form a theoretical framework that respects and responds to the opportunities offered by the technology of this time (García del Dujo & Martín-Lucas, 2020). How can we think of this framework from the reconfigurations and reontologisations we have been speaking of? This is the question we are interested in now.

We will start by acknowledging that perhaps one of the errors we have been reproducing in education is thinking of these technologies from a didactic and instrumental vision, which hinders theorising processes of generating knowledge. This is the reason why we propose that the first step in advancing in (theory of) education is to overcome this instrumentality firstly, because it is not appropriate at this time to continue reproducing and transferring traditional scenarios of education to a virtual environment because, as we have already noted, this technology is creating its own scenarios that we live and experience as real; differentiating between our activities online and offline is increasingly difficult (Floridi, 2014; 2015), that is why we should seek convergence between the traditional (physical) and new (virtual) scenarios. And secondly, in line with Langdon Winner's interpretation (1986) of technology, we must recall that the technology we have introduced into learning scenarios was not created for educational purposes, therefore, we must not think of it as a neutral element at our service (Sánchez Rojo, 2017). In other words, just like an industrial robot not only modifies production but also redefines the meaning of work, digital technology not only modifies how we access or store information but redefines how we generate knowledge, as we are talking about technologies that interfere with and infiltrate our thoughts, feelings, perceptions and behaviour patterns.

For all this, and with the aim of understanding what is changing in virtual environment learning processes, here we will explore two perspectives which, in our opinion, are determining what could be the foundations of that theoretical framework on how knowledge is generated in this new ecosystem.

First, in (theory of) education we must consider one of the greatest features and potentials of this technology: its autonomy. To better understand this we will take as a reference Luciano Floridi's interpretation (2010; 2014) of these technological devices, transferring them to education. Before the technological (r)evolution we are witnessing, technology could be classified as primary or secondary device based on whether it mediated between humans and nature, or between humans and another device. Respective examples are an umbrella between us and the rain,

or scissors between a tailor and a fabric. Not without reason, this author affirms that recent and future technological developments in our societies offer devices that have managed to leave us on the side-lines of this human-nature-technology interaction. For example, the smartphone that through our bank app communicates with a dataphone which, in turn, communicates with a digital bank platform to confirm money is available. In pedagogical terms, this approach makes us reconsider the role of technology in knowledge-building processes. We are referring to the fact that this technology can lead to new possibilities when building knowledge; in the words of authors such as Gabriel P. Swarts (2019), technologies such as *Siri*, *Cortana* or *Google Now* could act as teaching assistants in the learning process and thus facilitate more custom attention.

So, if the role this technology can play in educational actions is changing, the explanation on how knowledge is built in a world invaded by devices will also therefore change. Specifically, if we are witnessing a technology that increasingly acquires prominence in terms of autonomy, versatility and ubiquity, perhaps this technology must also be understood beyond its use as a technical agent, as a mere medium, reaching the level of an intervening agent, i.e., on a higher level than other predecessor technologies. And note that we are not referring to the fear that this technology can replace a human in the learning process because, in our opinion, a technological device or tool cannot have cognitive agency in the human sense insofar as it does not think, reason, operate or work like the human brain does. Nevertheless, this does not prevent us from assigning a higher level of action to tertiary devices compared to previous technologies such that different knowledge processes can emerge in synergistic combination with the human mind; specifically, considering this technology in educational action beyond a mere medium allows us to glimpse these possibilities, thus overcoming the instrumental vision we have spoken of.

The second perspective we propose is led by the implications of this technology regarding its capacity to extend our cognitive skills. Although reflection in the field of education on whether technology extends our mental skills is not new as these hypotheses date back to the 1990s with the emergence of distributed cognition (Hutchins, 1995) and extended mind theories (Clark & Chalmers, 1998), it is true that major developments have been achieved in the last decade in theoretical and empiric fields based on these approaches and as a result of convergence between branches of knowledge such as pedagogy, philosophy, psychology and neuroscience.

On one hand, Luciano Floridi's (2010) interpretation of informational life already warned that these digital and information technologies free us from the mental effort involved in superficial tasks like summarising, memorising, organising and storing information which, transferred to pedagogy, has serious implications in knowledge-building processes. And if we accept that these devices do not replace, rather

increase or extend, our cognitive skills, the first step would be to try to explore to what extent the technological devices of our time adapt to our mental processes when generating knowledge, as not all technologies will do it to the same level. In other words, some devices can acquire a certain cognitive status if they are profoundly integrated in our cognition; this is not so for other devices that do so superficially (Heersmink, 2015; 2017), e.g., using signposts on trails to walk along an unknown route can influence and help our cognition to achieve our goal, to reach the top of a mountain. However, customising the route with Google Maps or our favourite GPS app could be considered co-constitutive of the cognitive process of organising and completing the route as it requires more complex, profound and lasting interaction than using the trail signposts. In summary, this vision again offers a new interpretation of the technology of our time in which, while these devices cannot replace the subject, they can acquire a certain cognitive status that enables them to attain another plane or higher level compared to other technologies.

On the other hand, considering technology as an extension and release of some of our cognitive skills has led different authors to study and reflect on whether its use promotes or profoundly undermines our way of thinking. Authors such as Nicholas Carr (2011) and empirical studies such as Sparrow, Liu & Wegner (2011) argued that the use of technology does not allow us to think profoundly, rather invites us to be superficial as it makes it easier for us not to have to remember or summarise information because it is given to us on screens. Conversely, more recent publications such as Michael DeSchryver (2014; 2017), specifically his Theory of Web-Mediated Knowledge, argue that digital technology fosters the use of superior thinking skills by saving us effort and time on more superficial tasks such as searching for, memorising and storing information. Studies and reflections—in favour and against—that eventually coincide in some considerations; this technology provides new learning media which, by freeing us from more superficial tasks—such as memorising, storing, processing and distributing information—, allow us to focus on tasks that require greater effort—such as consuming, summarising and creating—. However, this new reality also poses significant challenges as, if we want to leverage the potential offered by these technologies, we must adapt our methodologies and ways of understanding knowledge building, starting with understanding what about this technology profoundly and/or superficially promotes or hinders our way of thinking when building knowledge (Heersmink & Knight, 2018; Loh & Kanai, 2016).

In any case, what we have been commenting shows that this new way of building knowledge favoured by the technology of our time requires different ways of theorising new phenomena. A task which, in our view, must begin with overcoming the instrumental vision of these devices. In other words, we must stop considering these technologies as mere technical agents and start to understand them as intervening agents.

5. CONCLUSSIONS AND OPENING PERSPECTIVES TO INVESTIGATION

We must recognise, as soon as possible (if we have not done so yet) that our current life scenario is dominated by a technology that is changing our human condition, our ways of being and experiencing our practices and relationships. In fact, it always has been by the technology of the time insofar as the relationship with the world mediated by a specific technology—the technology of each era—is inherent to the human condition, but perhaps in ours these changes or transformations are not only quicker, greater and broader, but different, so that human impact can end up being different, not only in magnitude and extension, not only in degree, but of a different nature. And this regarding all types of reality, i.e., a comprehensive impact on the human being. Also regarding education.

With this reference framework we conclude that our technology—whose fundamental features are given by one of its most inherent and characteristic components: screens, so that we see some things and not others, both just as important as the other, in both cases due to procedures and mechanisms that we do not see, but that should not therefore be beyond our consideration, and the ones we do we see in «screen mode», all with major phenomenological and ontological, epistemological and methodological implications—changes how we experience the world and, therefore, how we see and conceive ourselves and others in a permanent relationship with others and with each other, with things, including our way of seeing, knowing, feeling and understanding reality. In other words, what changes are our practices and ways of life and with them our ways of seeing, doing and thinking of reality, as well as how we do and think with each other. And all looking through an individual screen with significant conceptual and procedural implications.

Thus, consistent with this approach, it could be concluded that the world of education must be (and in fact is) affected by this technology, including the scenarios, times, subjects and, above all, practices, activities and relationship that give meaning to and shape educational processes and how this technology catalyses and guides them. As can be seen, we are moving well beyond a merely instrumental consideration of this technology, with all its derivatives, and, therefore, also beyond a reductionist reflection of media, ends and content, as we understand that both belong to a past era and that this technology has many other, more appropriate—and necessary we would say—niches for reflection to build a (theory of) education of our time as they point to redefining the concept and many of the terms and ways of thought and action in education.

With this intention, here we have presented three topics, relative to ways of being, knowing and experiencing the world through a screen, with sufficient potential for redirecting research into (theory of) education. Of course, they are not the only ones. We have chosen these three because they correspond to the authors' lines of

research and because, in some way, theory of education in our digital times rests on and revolves around them. These three headings hide questions of notable and vast importance, although they may initially seem only epistemological and methodological, on which we are working and which, in line with many other authors (Vansieleghem, Vlieghe & Zahn, 2019), we list in the form of questions:

- A first block of closely-linked questions emerge when taking epistemological aspects as a starting point: if what we see, feel and know through screens reontologises the reality of the subject's habitat, what happened to the modern concept of truth, now perhaps displaced by usefulness? And its complements of unity, coherence, history and progress? Is there already a sense of post-situation of current multiple, diverse and even convenient digital identities, always ephemeral and fleeting? How does the subject compensate, in an individual and collective sense, the breakdown they are experiencing as an individual and citizen? How is the habitat of an ontology of the present and of the moment, of the you and me now, rather than of the us? In education, does this mean the detraditionalisation of the subject, as an individual and citizen, in knowledge, languages and ways of thinking? What part in this operation corresponds to digital languages and modes (metadata) of perception and building the subject, of reality, and of knowledge of oneself and of that reality? Is redirecting activities, processes and curricula towards knowledge of digital grammar, of its anatomy and physiology, sufficient in (theory of) education to subject it to philosophical, political and economic criticism, not without first having standardised it pedagogically as is common in education; or, given the important transformation involved in a gradually post-digital society, must we consider education in its political status, in the strict and primary sense of collective and democratic coexistence and organisation of polis based on building subjectivities, individual and collective, always social? Is there another human and humanist answer worthy of our society in constant digital progression? How can we rebuild the dimensions of space and time in these environments, each to its full extent and both essential for creating, configuring and developing the subject, and which always play an important role in the nature of the educational process (García del Dujo, 2009)? In these scenarios of the materiality of things, of devices and cultural objects, of landscapes,...— aspects currently recovered for research in other fields (Criado-Boardo, Clark, Martínez Otero & Müller, 2020), to the astonishment of pedagogy — in which way must we address how we grant things their rightful place in building the subject and, therefore, in their education, and which theoretical reflection has almost always refused them, ignoring them? And a final question that combines many of the previous questions: how can we recompose the body-mind circuit in virtual environments, which

has always supported the educational processes and whose rupture by the very concept, nature and mechanisms of digital, looking at a screen, leaves the subject open to a swampy virtual territory, as if suddenly orphaned?

- In another vein, now of a methodological nature but with collateral impact on epistemological and ontological scopes, we must ask ourselves whether the quantitative potential (big data) and qualitative potential (creative, in processes and results of thought and affection) of this technology, in the new and specific scenarios it generates, can open the way, also in education, to new research methodologies. We are referring, on one hand, to the need to consider the phenomenon of big data in its dual, functional and structural sense (Daniel, 2019), in education insofar as it can be a new paradigm for research beyond traditional rationality — positivist, hermeneutic, aesthetic and historical-critical —, new forms of empiricism (Kitchin, 2014) that, together with recent disciplinary techniques and developments, are challenging thought on education, especially in fields such as building knowledge using the technology of our time where, on the other hand, we can observe new forms, processes and outcomes of thought that impact policies, pedagogy and educational practices (Buckingham Shum & Luckin, 2019).

All questions open to diverse types of research: epistemological, ontological, and methodological, but also ethical and political, and with sufficient potential to redirect research into (theory of) education, including the very concept and sense of educating and being educated.

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