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On Digital *Bildung*: Raising a Critical Awareness of Digital Matters

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Abstract
The aim of the article is to theoretically develop a notion of digital *Bildung* that accepts the "world" of today as characterised by the entanglement of humans and technology. I draw on Adorno's critical notion of *Bildung*, Luciano Floridi's and Katherine Hayles' respective understandings of the human-technology entanglement, and the social philosophy of the American philosopher Robert Brandom to understand *Bildung* as a piecemeal process. Nevertheless, *Bildung* is a rational process of making explicit the implicit connections to which we commit ourselves by being entangled in a tech–non-tech world. The article contributes to delineating a theoretical notion of digital *Bildung* that accepts and develops *Bildung* as critically precipitating from within this entanglement—what Brandom terms a semantic self-consciousness.

Keywords Digital *Bildung* · Internal vs. external critique · Expressivism · Adorno · R. Brandom

Introduction

A recent debate between Riis (2017a; 2017b) and Vlieghe (2017) indicated some interesting points about developing a notion of *Bildung*[1] related to digital technological phenomena. One central discussion point turned on the possibility of developing a critical view on the relationship between technologies and education, either by establishing an external non-technological point of view or by an internal predominantly technological-based point of view. Do we need non-technological skills as a part of *Bildung* to evaluate the use of technology, or do we, by learning to use technology, develop enough insight to secure this evaluation from within. This article builds on this discussion by analysing and discussing

[1] In what follows, I will assume that *Bildung* means digital *Bildung.* So reference to *technology*, unless otherwise stated, means *digital technology*.

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how critical awareness as part of *Bildung* can be developed. I will argue, first, that Riis and Vlieghe, in their discussion of *Bildung*, presuppose an old-fashioned ontology that does not accept the entanglement of technological and non-technological phenomena. Second, a consequence of this is the claim that *Bildung* consists of the ability to adopt a standpoint not affected by the entanglement and that either criticises or secures our understanding of technology. This more classical understanding of *Bildung* as a kind of informed determination of the relationship with the surrounding world is then contrasted with an Adorno-inspired understanding of *Bildung.* Adorno's view on *Bildung* would imply accepting the entanglement of technological and non-technological phenomena, with people being both influenced and influencing these phenomena. Since this influencing is not transparent and cannot be comprehended in its totality, *Bildung* then becomes more about delineating the limits of our understanding of the surrounding world than enforcing a specific relation to it. The challenge is to establish a critical awareness of these limits. Since these phenomena cannot be understood in their totality, this critical awareness is not a matter of making a representation of these phenomena but rather of understanding them as a matter of expression. Furthermore, it must proceed from within the entanglement; hence, it must be an internal rather than an external critique, and due to the opacity of the entanglement, a way of making these limits explicit must be conceptualised.

I will suggest here that the American social philosopher Robert Brandom can help in this regard. Brandom presents us with tools for understanding *Bildung* as the development of a critical semantic self-consciousness, and in our case, the concepts needed to make our implicit dealings embedded within a joint analogue and digital reality explicit. Central to Brandom's view is developing a vocabulary explicating or expressing this entanglement, and one conclusion will be that the future understanding of a notion of digital *Bildung* hinges on the development of this kind of vocabulary. We have only just scratched the surface in understanding the complexity of the technological and non-technological entanglement, as well as in developing a vocabulary that allows us to express this understanding.

In this article, I will first delineate and analyse the discussion on *Bildung* by Riis and Vlieghe and criticise their notion of *Bildung*, adopting some insights from Thompson's interpretation of Adorno's work. I will then present the thoughts of Floridi and Hayles as two ways of understanding the entanglement of technological and non-technological phenomena. Based on this, we will move on to thinking about how to theoretically understand *Bildung* as developing an internal critique of technological phenomena. Brandom's work indicates some trajectories for developing this, and we will discuss his proposal as a means for developing a critical awareness of technological phenomena. The goal of the article is not to delineate digital *Bildung* as consisting of different kinds of skills or competencies but rather how we should understand it as a critical and gradual explicating process of our digital lives as a whole.

Riis and Vlieghe—A Debate on Internal/External Criticism

A recent debate between Riis (2017a; 2017b) and Vlieghe (2017) in *Foundations in Science* raised some interesting questions concerning the content of digital *Bildung* and how a process of *Bildung* can be established.

Both Riis and Vlieghe agree that too optimistic an attitude towards the role of using ICT within learning environments has been prevalent. Riis (2017a, 386–387), for example, refers to UNESCO emphasising ICT's great potential for developing learning environments and understanding ICT literacy as primarily a practical skill. As Riis notes, this is an unsubstantiated claim that lacks actual analysis and supporting evidence. Furthermore, it fails to consider ICT literacy as involving theoretical and critical skills. Vlieghe agrees with Riis that there is a need to present a critical assessment of ICT as "…part of ICT literacy and a much needed measure to act as a counterweight to the marketing of ICT done by policy makers and tech producers alike" (2017a, 388). However, Riis and Vlieghe disagree on how this *critical assessment of ICT as part of ICT literacy* must be understood. As we will see, both present good arguments for claiming the necessity of an internal versus an external critique. A premise in this article, following Floridi and Hayles below, is that this is a false alternative because it is based on a simple ontology of demarcating the technological and non-technological side of reality.

Riis: The Necessity of an External Critique

Riis bases his approach on a phenomenological analysis of how technology works, that is, Heidegger's well-known distinction between zuhanden and vorhanden in *Sein und Zeit*. Technology works best here when it is in the background, serving its purpose as a means to an end. Only when a given piece of technology breaks down should it claim our attention for repair or replacement, which allows us to proceed with our projects and the ends to which the technology contributes. The problem, Riis claims, is that the increasing invention and advent of technology has made technology its own goal, which leaves very little, if any, room for understanding technology critically. Instead, we should follow Rheingold (2012), who evaluates technology as a contribution, in a broad sense, to our "art of living". Thus, ICT literacy implies developing practical ICT skills while also critically understanding the influence of ICT on and within our lives. Riis claims:

> "In this view, ICT literacy is closely connected to the ability to situate and understand ICT in a larger framework. The difference between these notions of literacy is, for one thing, that the former account of ICT literacy translates problems and potentials into questions of using ICT the right way, whereas the latter notion of ICT literacy also critically assesses the limitations of ICT and points beyond it". (2017a, 392)

Assessing the limitations critically implies reckoning with and thus indicating an *external view* from which technology is to be assessed as part of *Bildung*. This implies understanding the necessity of developing non-technological skills, such as comparing ICT to user needs, thereby developing a critical awareness and reflexive sensibility of the limits of the relevant sphere within which using technology as a means for teaching and learning makes sense.

Vlieghe: Internal Critique as the way Forth

Vlieghe agrees with Riis on several points but disagrees with the need for an external critique. He claims:

> "…the position Riis takes could be termed external: he starts from an idea about education that is not affected by technological evolutions and in view of which these evolutions should be assessed. This is a position which has been taken innumerable times by educationalists, since the days of Socrates: to become a free and sensible human being, one must become conscious of the limitations of the situation one is in". (2017, 403)

Following Bernhard Stiegler (2010), Vlieghe claims that education has always relied on technologies, such as the technologies for writing, or the hammers, rulers, and saws for carpentry, as part of the processes of *Bildung*. Furthermore, this reliance has sought to ensure a sense in which technologies help form our lives without turning them into a process of deformation. Hence, as Vlieghe claims, the importance of ICT literacy is the result of the fact "…that humankind's dependency upon technology always demands an adequate educational response" (Vlieghe 2017, 403). To respond adequately, it must at least be possible to become aware of how we are dependent on technologies. Here, Vlieghe departs from Riis for whom what matters is "…becoming conscious of conditions that escape our attention by taking a position outside of these conditions. I think this is exactly what Riis calls for" (Vlieghe 2017, 403). In contradistinction, Vlieghe claims that the process of *Bildung* or becoming an educated person is not tantamount to adopting an external position unaffected by contingent technological conditions. Instead, he argues for an internal concept of ICT literacy.

This does not imply accepting the latest technology uncritically but rather taking a "… critical point of view from within the technological conditions that happen to be the contemporary ones" (Vlieghe 2017, 404). Thus, Vlieghe disagrees with Riis in not accepting the plea for non-technical ICT literacy. According to him, what is needed is a critical and internal form of ICT literacy, involving "…an initiation into information and communication technology in a most *technical* manner" (ibid.). He draws an analogy between reading and writing, claiming that spelling or doing grammar involves more than just reading and writing. It involves an experience of text from the inside, developing thereby a specific relation to the texts red or produced. Developing a specific relation to the texts one writes and reads by repeated exercise of using the same letters and words provides first-hand knowledge of the production of text and of the possibilities and constraints of this kind of technology. The same kind of critical knowledge goes for digital technology; thus, *Bildung* would imply "…a grammatization of digital literacy in a most technical sense of this word: a bodily ingrained, practiced knowledge of what it means to produce digital stuff" (ibid.). Now, Vlieghe claims that this 'more' created by the doing of technology is not merely a practical knowledge–and in this he claims to agree with Riis–but he never explains how this becomes basis for an internal critique. It appears thus, for Vlieghe, the critique seems more of a technological critique (in a most technical manner and sense, as it says in the quotes above) from within the contemporary technological conditions, aiming at evaluating the productive capacities of digital technology. Instead, the following will pick up on this 'more' trying to indicate how this could serve as a basis for critique.

Critique: Internal and External

The debate between Riis and Vlieghe seems to present us with a dilemma. As Aagaard has expressed, "…Vlieghe is surely right that the criticism invokes an essentialising humanism that obscures the interwovenness of humans and ICTs in our digital times, but Riis is equally right that the defence risks becoming an uncritical affirmation of technology" (2021, 42). I would claim that this dilemma occurs due to the external/internal distinction. Furthermore, I think we can dispense with the dilemma because it is a false alternative for several reasons.

First, the distinction between the non-technological and technological areas presented by Riis is difficult to uphold. He invokes art as one example of a non-technological area, but as Vlieghe claims, just using a painting brush is a kind of technology. Furthermore, a significant trait of contemporary artworks is the use of both digital and analogical technology (Dunne 2008). This indicates the difficulty of identifying a significant place where the non-technological exists—that is, a place with such general relevance as Riis suggests—on which such a criticism can be anchored and fostered. Vlieghe's suggestion that we always have, to some degree, been dependent upon technologies seems more realistic, and will be elaborated below in discussing Floridi's and Hayles' descriptions of this dependency. However, Vlieghe seems to go too far in the other direction, claiming that initiation into ICT in the *most technological manner* is what is needed. Here, understanding the possibilities and constraints of the use of technology seems to be the primary driver for establishing any critical insight. However, the use of technology is also internally related to different sociological and cultural conditions and forms of knowledge. How these relations are significant for the use of technology, is just as philosophically relevant for establishing an internal critique as Vlieghe's "practiced knowledge of what it means to produce digital stuff". This might be even more important. Because similar to Riis' claim of a safe or pure place outside of technology for critique to exist, Vlieghe seems to emphasise the critique oftechnology or technological thinking as a matter of evaluating the means of producing digital stuff from within the contemporary technological conditions. If this implies sociological or other kinds of knowledge, he fails to indicate how this is *not* just serving the practical knowledge of producing digital stuff, but also a limit or constraint to it. Vlieghe's internal critique therefore seems technologically myopic thereby facing the risk of becoming a docile (quasi) critique only.

Second, Riis' and Vlieghe's critiques seem to presuppose an ontology with the possibility of upholding a clear demarcation between the realms of the technological and the non-technological. The difference between their critiques is that each accentuates different parts of this demarcation. Whereas the external critique presupposes this ontology to secure a non-technological place from where it can proceed, the internal critique presupposes it to establish a place of evaluating technology mainly from within. Recent philosophical research into technology, for example, the work of Latour and Pickering, and research into pedagogy and technology like Fawns, or those of Floridi and Hayles, which will be touched upon below, suggests the difficulty of upholding this demarcation. Instead, I claim the necessity of an entanglement or dialectic between the technological and non-technological. This does not obliterate any difference between the technological and non-technological, but it suggests presenting this difference or differences in a more non-substantialist way.

Third, the distinction between internal and external seems to be a false alternative based on a questionable ontology. If we accept a more entangled notion of technological and

non-technological, then a different kind of notion of critique is needed (for a similar point, see also Chimirri and Schraube, 2019 and Fawns 2022). A critique capable of making the implicitness of this entanglement explicit should present us, with an indication of what the different implications—limiting or catalyzing—of this entanglement are. The process of *Bildung* therefore has more to do with becoming aware of how these entanglements contribute to the formation or deformation of our digital humanity—that is, of our experiences of ourselves and the world we are in.

In the following main sections, the notion of critique and *Bildung* will be analysed based on accepting the entanglement or dialectic between the technological and non-technological. However, we first need to address how to understand the notion of *Bildung*.

Reappraising Critique and Bildung

In light of the above critique, what, then, can we say of the notion of *Bildung*? It will be suggested here, following Thompson (2006) and her interpretation of Adorno, that the positions of Riis and Vlieghe are more related to Adorno's notion of *Halbbildung* than *Bildung*. Furthermore, accepting a notion of *Bildung* not tampered by a dubious history means presenting a few desiderata for understanding it as a contemporary concept.

Let us begin with the last part. As Herdt (2019) claims, the term *Bildung* is related to the German words of both 'image' (bild) and to form, shape, or construct (bilden). Thus, in both Greek and Christian thought, and in more modern developments such as Herder, Humboldt, and Hegel, the 'image' of the development of human beings, their education, was a process of 'formation'. The 'image' of this development was then interpreted as 'in the image of god' with humans obliged to become similar to God because they were created in the image of the self-same. Or, the 'image' was secularised as a way in which humans realise their natural capacities. Either way, the 'image' indicated human beings as working towards the goal of a harmonious development of all their capacities into a balanced and unified whole. The trouble here is that this image of *Bildung* has been used to justify colonialism, slavery, racism, and imperialism, treating human beings, that is, non-Europeans, as merely vestigial human and in 'need' of becoming human in the (image of the) European sense. This denigrating view of non-Europeans presupposed *Bildung* as a process with a pregiven telos, a means to an end, and this telos was being educated as a European. Countering this, then, implies understanding *Bildung* rather as a living engagement with and within the world but without a pregiven telos. In this understanding, *Bildung* would be more of an unfinished process with the formation of humanity, or the shaping of individuals that is never completed. Education is more like education for life or, more precisely, education *in* life. Adorno's concept of *Bildung* is similar to this understanding and interpreting his notion through Thompson will present us with an additional understanding of the problematic ontological assumption shared by Riis and Vlieghe.

First, Thompson emphasises the notion of *Halbbildung*, that is, Adorno's ambivalent relation to the notion of *Bildung*. "On the one hand, he believed the "'living engagement of the individual with the world'" to be the very heart of *Bildung*. On the other hand, Adorno thought that existing social conditions no longer allowed for the possibility of *Bildung*. *Bildung* has deteriorated into its own "mortal enemy," Halbbildung" (Thompson 2006, 72). The social conditions today preventing *Bildung* are the increasing marketisation of education, with universities and schools understood as service institutions and students as

customers. In this context, *Bildung*, or becoming educated, no longer changes students and their point of view. Rather, the intention is enhancing the students' spectrum of assets or competences, including developing technological skills, making them stand out from one another and compete for jobs. Understood through the above concepts, the 'image' in which students are 'formed' is the marketplace. This is not *Bildung.* Knowledge becomes what is useful primarily for the marketplace: competences for making a living, not for understanding what living a life means. I suppose that both Riis and Vlieghe would agree with this observation despite speaking of competences. What was suggested by describing their positions as cases of *Halbbildung* is sharing a strand of conservative culture criticism, "…in which one refers to unaffected origins or uncompromised ideas to judge the contemporary conditions of society" (Thompson 2006, 74). For Thompson, this amounts to an idealisation of *Bildung* that serves to reaffirm social structures of domination, of claiming to be able to identify *the* uncompromised idea serving as the basis for *Bildung*. In our case, it is either a technology criticism from the outside (Riis) or a docile evaluation from the inside (Vlieghe). However, "…*Bildung* is not an identifiable set of knowledge or the acquisition of particular competences. Rather, it is an uncontrollable event that enables us to investigate views of ourselves and the world that are imposed on us and that could be otherwise. By revealing these limits, *Bildung* keeps open the possibility that ''what is, is not everything there is" (Thompson 2006, 86).

Second, as alluded to, *Bildung* is an unfinished process, and persons are never self-sufficient participants herein. In classical *Bildung*, people enrich themselves through their willed engagements with the world; as indicated by Riis and Vlieghe, *Bildung* is established through a specific critical attitude towards technology. Achieving experience through these engagements, people grow—they are formed—as individual human beings, a growth that potentially never ends. For Thompson, this appears to be an unrealistic idea of people wilfully able to determine whatever relations they want within the world, as if nothing unexpected occasionally happens to and forms them. However, equally unrealistic is claiming that people are determined totally by the world, as if being a teacher, with its accompanying demands and expectations, determines the rest of what this teacher does. Does our knowledge of the world equal our knowledge of either how we influence things or how things influence us? Not really; according to Thompson's Adorno, instead, our engaging relations with the world, the foremost premise for learning anything about the world and ourselves, is similar to the experience of a border or rift for which we can never really give a comprehensive account. Hence, who we are and how we approach or understand the world cannot be determined totally by us or someone else. Our understanding of ourselves and our surroundings is always accompanied by a sense of being in the making. Instead of causing any despair, this implies for Thompson "Adorno's provocative statement that we cannot fully determine our existing relations to the world and to ourselves, and that we cannot be determined by them, makes critical reflection on our present situation possible" (2006, 84). Thus, becoming aware of these borders, that they exist, is where the possibility of critique lies—because therein lies the possibility of a shift of perspective on ourselves and the world around us. Here, *Bildung* has more to do with our insight into the limits of grasping ourselves and the world, for example, how social imperatives are at work in our representations of education and ourselves, or how algorithms display certain forms of bias when used as tools for distributing grades across an educational system marked by a pandemic[2]. *Bildung*

[2] I am thinking here of the case of ofqual. See British Government (2020).

thus raises a critical awareness of our engaging relations with the world and ourselves by making these limits explicit. It is the constant vigilance of what we might yet have to find out or do about our knowledge and dealings.

Adorno's notion of *Bildung* is therefore a better way to capture the challenge stated above, that is, critically becoming aware of how tech-non-tech entanglements limit our experiences of ourselves and the world we are in. This Adorno-inspired perspective on *Bildung* as more of a process of the lives we live than the use of a particular competence, and consisting of an insight into the limits of our engagement with the world, will serve as background for the next two sections on tech-non-tech entanglement and will make these entanglements explicit.

Floridi and Hayles—Infosphere, Inforgs, and the Cognitive Non-Conscious

How should we understand this engagement with the world, central to the notion of *Bildung* delineated above? Our point of departure here will be Floridi' and Hayles' notions, since both offer ways of understanding a non-dualist world, one that is technologically and non-technologically entangled.

Floridi: The Infosphere and the Inforgs Inhabiting it

Floridi (2014) describes how modern technological reality is akin to an infosphere, with people characterised as informational organisms, inforgs, because of a fourth informational revolution. After the Copernican, that humans are not the centre of the universe; the Darwinian, that humans are not the creation of god but are biologically related to other species; the Freudian, that our rational capacities comprise only a part of our consciousness and often not in charge when unconscious desires and wants are involved, comes the latest revolution, the informational (see also Floridi 2013). The figure epitomising the informational revolution is Alan Turing, because for Turing "…the possibility that we would engineer autonomous machines that could surpass us at processing information logically and hence be behaviourally smarter than us whenever information processing was all that was required to accomplish a task" (Floridi 2014, 93). All these revolutions indicate that humans are less and less their own masters or mistresses but seem to depend upon conditions in which they are not in control. This has profound consequences, as Floridi claims:

> "After Turing's groundbreaking work, computer science and the related ICTs have exercised both an extrovert and an introvert influence on our understanding. They have provided unprecedented scientific insights into natural and artificial realities, as well as engineering powers over them. *And they have cast new light on who we are, how we are related to the world and to each other, and hence how we conceive ourselves*" (Floridi 2014, 93) (emphasis mine).

Let us unpack this quote by delineating how Floridi conceives this technological world to which we relate, and what it means for our understanding of ourselves and each other. First, Floridi terms the world to which we are now related infosphere. Whereas we were

previously dependent upon ICT as one technology, among many others, we are now in a situation where we are almost entirely dependent on ICT. ICT saturates basically all aspects of our lives, through pervasive computing, the Internet of Things, etc., often without us noticing it (Floridi 2014, 5–6). A car today contains, for example, more computing power than the power used by NASA to fly astronauts to the moon in the 60s. We fail to notice this because the technological character of ICT is unlike that of other technologies. For Floridi, technology is generally characterised by its *in-betweenness* (Floridi 2014, 25ff). Technology acts between agents and prompts them to use technology. Thus, a bright, hot summer sun would be a natural prompter to wear a hat; hence, we interact with the natural environment using the hat as a technology. Floridi terms this a first-order in-betweenness. In the second order in-betweenness, the primary prompter is no longer the natural environment but technology itself. Here, technology is used to interact with other technologies. A simple interaction, such as using a power drill to screw, involves the power drill interacting with a screw. This might, of course, be prompted by the bookshelves that I want to put up for my books. However, much more advanced interactions, such as interacting with a computer, can be described in this way as well. In this case, we interact with the computer through the graphic user interface, and the computer performs many complicated interactions with its programs and other devices, including wireless networks and different kinds of servers. Human interaction with computers has thus become increasingly functionally easy. We almost never interact with the background processes in the computer or between computers but primarily with the easy-to-understand windows, icons, and menus on the desktop. Now, Floridi's point is that our modern-day informational society is characterised by third-order technological relations (techs interact with techs who interact with other techs), where humans have almost been taken out of the technological relations. It is, as Turing claimed, much more efficient if technologies interact with each other, since they process information way faster than we can ever do. Floridi puts the point this way:

> "Essentially, third-order technologies (including the Internet of Things) are about removing us, the cumbersome human in-betweeners, off the loop. In a defragmented and fully integrated infosphere, the invisible coordination between devices will be as seamless as the way in which your smartphone interacts with your laptop and the latter interacts with the printer". (2014, 32)

Thus, the infosphere is a multifaceted and complicated interaction between many different devices and on many different levels. Furthermore, we are without precedent dependent (not determined, as we will see below) upon these technological interactions—what Hayles, as we will see below, terms the technological non-conscious. Not unconscious, but non-conscious, because it structures our reality in ways we are not aware of.

Second, when our technological reality is made up of technologies interacting with each other, structuring our relations to the world in ways we are not aware of, this influences how we understand ourselves as relating to this world. In Floridi's terminology, we are informational organisms, or inforgs, "…mutually connected and embedded in an informational environment (the infosphere), which we share with other informational agents, both natural and artificial, that also process information logically and autonomously" (2014, 95). Floridi claims that three misconceptions about mutual connectedness exist. First, this is not like the well-known thesis of the extended mind (Clark and Chalmers 1998), wherein different

kinds of devices, such as a smartphone, is understood as extending the mind because certain cognitive capabilities, for example, remembering phone numbers, is outsourced to it. For Floridi, this kind of 'mental outsourcing' presupposes—similar to Adorno's determining individual—a standalone Cartesian agent, fully in charge of its environment. Second, Floridi claims that this mutual connectedness is not to be compared with similar fictional claims of posthumanism or transhumanism, which postulate the possibility of a humanity in charge of its informational DNA, hence capable of planning its future embodiments (e.g. Bostrom 2005). Third, Floridi emphasises that this is not to be understood like the idea of a cyborg (e.g. Haraway 1991), that technology and the human body have somehow merged. Imagine attempts to eliminate screens in favour of bodily projections, so you can dial a number using a virtual keyboard that appears on your palm. Floridi suggests that being a cyborg is not something people would embrace but would avoid. Instead of 'dialing' your hand, imagine then just vocalising the phone and it responds to you. Here, the connection consists of more of two agents interacting and sharing the same environment. Thus, what Floridi has in mind:

> "…is rather a quieter, less sensational, and yet more crucial and profound change in our conception of what it means to be human. We are regularly outsmarted and outperformed by our ICTs. They 'reckon' better than we do. And because of this, they are modifying or creating the environment in which we live. We have begun to understand ourselves as inforgs not through some biotechnological transformations in our bodies, but, more seriously and realistically, through the radical transformation of our environment and the agents operating within it". (2014, 96)

To see how this transformation of the environment can become a subject of not just our self-understanding as inforgs but also a question or thematic for our *Bildung*, we need to turn our attention to Katherine Hayles. Floridi does not touch upon the effect of the informational revolution on our lives as something taken up by people individually and/or collectively, and here Hayles can contribute. The impact of ICT has, as Hayles claims, a profound impact on cognition and consciousness. Thus, if we want to become aware of the informational environment and its impact on us, we need to stress the (in)*formation*(al) part of it. Raising consciousness of the in*formation*al exchange between humans and their environment is thus a formation of digital *Bildung*.

Hayles: The Cognitive Non-Conscious

Hayles (2016, 2020) distinguishes between cognition and thinking. Thinking is central to humans because it creates narratives that make sense of our lives and support assumptions of a coherent world. Cognition for Hayles, however, is a much broader capacity extending beyond consciousness and is something humans have in common with other life forms, and complex technical systems. Hayles terms this nonconscious cognition:

> "The point of emphasising nonconscious cognition is not to ignore the achievements of conscious thought, often seen as the defining characteristic of humans, but rather to arrive at a more balanced and accurate view of human cognitive ecology that opens it to comparisons with other biological cognizers on the one hand and on the other to the cognitive capabilities of technical systems". (2016, 784)

So, the radical transformation of our environment Floridi speaks about, is similar to Hayles' human cognitive ecology, but with Hayles wanting to map the transformative perspectives emerging once nonconscious cognition is understood as essential to human experience, biological life, and technical systems. Hayles' defines cognition as "…a process that interprets information within contexts that connect it with meaning" (2016, 792). Hence, cognition is not an attribute but a dynamic and situated process, with the interpretation distinguishing between several possibilities and choosing one or more of these as indicating ways of acting. Furthermore, in this understanding, cognition is entangled with nature as well as technical systems, with meaning created within different contexts involving biology and technology as influencing factors. Given that our focus is on digital technologies, we will leave the biological part not out but implicit[3]. Hayes terms this concrete interaction between humans and technologies assemblages, "…not to be understood as merely an amorphous blob. Although open to chance events in some respects, interactions within cognitive assemblages are precisely structured by the sensors, perceptors, actuators, and cognitive processes of the interactors" (Hayles 2016, 785). Again, as indicated by Floridi, this presents an understanding of the entanglement between humans and technologies and between inforgs and the infosphere, although with a more nuanced theoretical description or vocabulary of the cognitive processes behind them.

What is special about technologies within these kinds of assemblages is their development within complex ecologies, and one can understand this development as an optimisation of their ecological niches. For Hayles, computational media "…have a stronger evolutionary potential than any other technology, and they have this potential because of their cognitive capabilities, which among other functionalities enable them to simulate any other system" (Hayles 2016, 802). Similar to Floridi's notion, computational technologies have the ability to do some things much better than us. Hayles departs from Floridi, however, in her understanding of technologies as working at the level of nonconscious cognition and her claim that we need to bring this to our awareness. Thus, for Hayles, the challenge regarding technologies is:

> "To analyze and evaluate their effects, we need robust frameworks that recognize technical cognition as a fact, allowing us to break out of the centuries-old traditions that identify cognition solely with (human) consciousness. We also need a more accurate picture of how human cognitive ecology works, including its differences from and similarities to technical cognition". (2016, 808)

In other words, we need a framework for making these implicit connections within the human cognitive ecology—the co-engagement of humans, world, and technology—explicit. The rest of this article will present suggestions for building a notion of digital *Bildung* out of this non-dualist ontology of human cognitive ecology. These suggestions, first, present a viable understanding of the commonality and difference between human and technological cognition and, continuing Hayles, raising the consciousness, or awareness, of the nonconscious parts of the cognitive ecology we engage in. Second, raising this consciousness is tantamount to making our implicit dealings within this ecology explicit. However, since these dealings concern a plenitude of processes that we are unaware of, as Floridi and Hay-

[3] This would need to take the whole discussion of philosophical naturalism into consideration, and given our non-determinist and non-reductionist point of departure, Rouse (2015) would be a good place to start.

les suggest, this explicating is not a self-determination in the old sense of *Bildung* above. Hence, we cannot form a representation of the world by enforcing our thoughts and wants. Delineating the rift between the infosphere and us as inforgs, we move our efforts from a representational to an expressive understanding of making our cognitive ecology explicit. This indicates also that the notion of *Bildung* cannot be understood as a digital literacy competence, but must connect with lives as a whole within this new expanded ecology. Third, to this end, we need to pay more attention to the vocabularies we use in identifying and bringing elements within our environment to our attention. In short, we need words and concepts that make us aware of the assemblages we inhabit when we engage with the world. Hence, putting forth a vocabulary is paying attention to what one needs to *say and express* to specify those *doings* we engage in.

Making our (Technological) Dealings with the (Technological) World Explicit

Let us take stock. Vlieghe and Riis were criticised for not fully accepting the entanglement between humans and technology but for wanting to secure a place for (a self-determining) critique without the influence of either technological or non-technological values. Inspired by Adorno, this was termed a Halbbildung position, in need of accepting the indeterminateness of the entanglement to qualify as *Bildung*. Floridi and Hayles were then presented as two examples of how to understand this entanglement – that our digital engagement is part of our cognitive ecology as a whole. Now, we need to address how *Bildung* relates to this.

The three suggestions indicated above will be developed using the work of the American philosopher Robert Brandom. Brandom's main aim is to make transparent the implicit relations we commit ourselves to through our engagements with the world and is thus relevant here. I will emphasise only trajectories of Brandom's thinking related to the desiderata above; thus, it will, of course, be a reduced presentation (see also Derry 2008). Nevertheless, Brandom is relevant for several additional reasons. First, akin to Hayles' distinction between thinking and cognition, Brandom operates with a distinction between sapience and sentience. Although these are distinguishable, they do not form a duality but are instead intertwined. Sentience is our commonality with non-verbal animals and—it will be assumed here—technologies, the capacity to be aware in the sense of being awake. Sapience concerns our understanding or intelligibility; someone is treated as sapient when intentional states, such as belief and desire constituting reasons for their behaviour, can be attributed to them (Brandom 2000, 157). Being sapient thus means acting as though reasons matter to one, and reasoning here means understanding what follows from what and what is incompatible with what. Second, this reasoning hinges on an inferentiality that is both material and social (Christensen 2021). Our reasoned practices are, as Brandom claims, "…solid—as one might say corporeal: they involve actual bodies, including both our own and the others (animate and inanimate) we have practical and empirical dealings with" (MIE, 332). Third, bringing these implicit inferential relations forth, making them explicit, depends on establishing a vocabulary that assists in becoming aware, identifying, and understanding (the limits) of these relations. A vocabulary is *expressive*; it is a means of articulating the content of our implicit inferential dealings with the world. Thus, making these dealings explicit is sapience that comes to understand itself as sentient. It establishes a consciousness

of ourselves as participating in a cognitive ecology involving technologies and determinate and indeterminate relations. Making inferentiality explicit through our expressive means is thus also providing the possibility of criticising it, a mark of *Bildung*, as presented above.

Sapience and Sentience

At the heart of Brandom's understanding of sapience and sentience lies a two-ply account of peoples' conceptual interactions with their surroundings. The first ply, according to Brandom, is the sentience we share with animals and technologies, and it consists of *reliably differential responsive dispositions*. First, responding differentially means being able to distinguish between things—that is, understanding the limits between them. In this sense, animals might be able to distinguish between colours or between foods, or even combine them, as in '*this* red caterpillar is not food, whereas the yellow one over there is'. Similarly, a computer program responds differentially to stimuli by the way it has been programmed, such as a self-driving car that stops for red light. If this responsivity is reliable, it is a primitive "… kind of practical taking *of* something *as* something. It is in this sense that an animal's eating something can be interpreted as it is thereby *taking* what it eats *as* food" (Brandom 1994, 33f). Thus, at this level, interacting with surroundings consists of classifying stimuli as well as acting in accordance with this classification. A thermostat, for example, classifies temperature in a room and acts by increasing or decreasing the temperature. As this occurs in a 'cognitive ecology', humans within this room will respond to the rise or fall of temperature in the room by operating the thermostat, opening a window, putting on clothes, etc. This, then, is an admittedly brief example of Floridi's entanglement of technology and humans interacting by just responding to and acting on each other.

The second ply of this account is what I take as similar to Hayles' notion of consciousness, although for Brandom it contains self-consciousness and shared forms of sentience as well. Whereas the thermostat responds to the environment as a stimulus, humans respond to the environment as a matter of reason. We can respond to the temperature in the room by closing the window with claims such as it is getting cold, the heat prices are up, and we will catch a cold. This is the sentient character of humans. Whereas the disposition to reliably respond to a red thing as red is something we can share with animals and technologies, the ability to understand the redness of a thing as an instance of the concept of colour is not. Nor do we understand the redness of a thing as different from the redness of a traffic light. Thus, we need to consider the normativity of the context of either making a claim about colours or the practices related to dealing with traffic lights. We can explicate—using our discursivity, that is, our relevant vocabularies for the practice in question—why we stop for a red light and move again when another colour appears, or why we do not stop if somebody holds up a red tomato next to the traffic light. Thus, moving into this context of normativity, or a space of reasons, means understanding our engagement in the world as articulating how this involves basic kinds of commitments and responsibilities. For example, saying something is red is to say—accept— this same thing has a colour, or, if this something is red all over, that it is incompatible with being green all over. Although holding up a tomato is not conducive to making the traffic stop, it might be able to stop your wife from buying tomatoes at the grocery store if she sees you. Derry sums it up very nicely:

> "For Brandom, the distinguishing feature of a thinking being is its responsiveness to reasons rather than simply to causes. Responsiveness to causes is characteristic of a machine or a parrot capable of responding differentially to a stimulus, but not of thinking beings qua thinking beings. A mechanical alarm may be far more effective in perceiving the dangers of a fire and sounding the alert than any human being. But when a human being shouts 'Fire' he or she is always doing more than simply making a warning noise. When a child of five (as opposed to a much younger child whose uttered sounds are only just beginning to operate as language) shouts 'Fire' he or she knows its implications". (2008, 59)

Brandom names the analysis of these practices that contain commitments and responsibilities and consist of normative implications (rights and wrongs) and exclusions (incompatibilities) as a normative pragmatic. Saying what it is we are doing by engaging in these normative practices is using different means of expression to show our responses to reasons. This makes the inferential character of our normative practices explicit.

Brandom does a lot of intricate analysis of the relation between sapience and sentience as a relation between normative pragmatics and inferential semantics. Our interest, however, is the movement of making these implicit relations explicit. As already suggested, this process provides us both with piecemeal knowledge of the world we engage with (and engaging with us), together with piecemeal knowledge of what we are doing when we engage this world. As also suggested, this knowledge consists of both implications and exclusions; thus, it tries to establish what we can know and where a border exists for what we can say. *Bildung* is therefore akin to a sense of coming to know what follows from what and what does not while engaging with the world and establishing a consciousness of ourselves as involved in and learning through this process. This process, as a process of making explicit, is not a matter of making the correct representation of the world around us. That would be assuming a dualist ontology like the one described above, making a representational relation between technological and non-technological foundational, for example, a correct representation of the technological world to know how to deal with it. For Brandom, the meaning of an object is not a representation of the object; rather, it is the system of inferences the object is involved in. For example, the meaning of an 'I accept' button on an internet page is not a representation that carries the meaning of 'pushing the button means entering the page'. Rather, the action of clicking the button connects with a system of inferential implications, such as committing myself to allowing the installation of cookies on my computer, allowing the monitoring of my digital behaviour, renouncing both the rights to my data and any responsibility towards me by the company monitoring me, allowing the selling of this data to third parties, and commercialisation based on my data and similar targeted behaviour on the internet. All these inferential implications serve as just a little grid of my engagement with Floridi's infosphere. Making these implicit normative relations explicit is not a matter of making a representation—because we cannot form a whole picture of these relations, as Adorno's claim above. Instead, the relation is expressive, and through expressive means, the concepts we use as part of establishing a digital *Bildung*, we are able to describe, in a piecemeal fashion, our engagement with the world. An important question remains as to whether we have the necessary concepts to articulate or express our engagements with the infosphere. In any case, part of the process of *Bildung* is becoming aware of and capable of expressing this.

From Representation to Expression and Inferentiality

Behind Brandom's notion of expressivity and inferentialism is an opposition to what he terms representationalism understood in both a historical and conceptual or semantic sense. In the historical sense, precursors to Brandom exist, namely Isiah Berlin (1976) and Charles Taylor (1979; 1989), who spawned discussions in the 80s regarding the historical lessons of the enlightenment versus counter-enlightenment/romantic face-off (see Smith 2010). For Brandom, the notion of representation has dominated enlightenment epistemology since at least Descartes. Awareness was understood in representational terms as either direct awareness of representings (a clear and distinct idea of a triangle) or indirectly via representations of the represented (impressions of the triangle's specific form, colour, size, etc.). Whereas this presents our mind as a kind of mirror of the surrounding world, Brandom's expressivism portrays the mind more as a lamp:

> "Broadly cognitive activity was to be seen not as a kind of passive reflection but as a kind of active revelation. Emphasising the importance of experimental intervention and the creative character of theory production motivated an assimilation of scientific to artistic activity, of finding as constrained making—a picture of knowing nature as producing a second nature…" (AR, 8).

Here, we see a well-known figure of *Bildung*, namely that by knowing nature, we develop a second nature. However, it is a second nature, with the constraints of indeterminacy noted above through experimental intervention and finding as constrained making. Instead of knowledge- and meaning- making being a result of passive reflection of the world, and thereby presupposing a difference to the world, it is by engaging ourselves with the world that we come to know about it and ourselves.

The active revelation is, furthermore, having an expressivist character. Not as in traditional expressivism as something inner becomes outer, as a feeling expressed by a gesture, but as making explicit what is implicit. And this is understood in an active sense "…of turning something we can initially only do into something we can say: codifying some sort of knowing how in the form of a knowing that" (AR, 8). We will touch upon how we are to understand this knowledge in the next section, but the important part is that it involves a conceptualising process. What we initially were only aware of in clicking the 'I accept' button above becomes a matter of being knowledgeable of, by learning to describe what we are doing by clicking the button. The notion of a vocabulary or theory becomes important as a means of expressing what we do, and as Brandom claims, in some cases "…specification of what is implicit may depend on the possibility of making it explicit" (AR, 9). Whereas other vocabularies are well worked out—describing what it is we are doing when engaging in reading, writing, or doing math—we are still developing a vocabulary for telling the specificities of the engagements between the infosphere and us as inforgs. Conceptualising as understood by Brandom is being able to make a claim or judgment about "…what one is (thereby) aware of, forming a belief about it—in general, addressing it in a form that can serve as and stand in need of reasons, making it *inferentially* significant" (AR, 16).

The process of understanding the knowing above returns here as being inferentially significant with some related points. The first is that being inferentially significant or explicit is to be propositionally contentful (AR, 17). By that, Brandom means that being able to

articulate something hinges on engaging in linguistic practices, with a predominant focus on telling what follows from what and what does not, hence also being able to critically offer justifications. Second, this is not to be understood as just appropriately responding to red things by making the noise 'red'. To be recognised as a capable user of the concept of red, the use must be put in a larger context, with the actual use being inferentially significant. One must be capable of "…providing reasons for making other moves in the language game, and as themselves potentially standing in need of reasons that could be provided by making still other moves" (AR, 17). Imagine using the concept red in two different language games/normative practices of considering wine and learning the rules of traffic. The arguments and how the concept of red can be used according to these practices differ, despite being the same concept. Regarding wine, we use different nuances of red to describe the colour, and it would be 'strange' to start a discussion of what kind of red the traffic light is. Third, several notions of implicitness are implied here. One is what is made explicit by a claim, such as a proposition, a fact, or what is thought or believed. Another is what is still implicit in such a claim, namely its inferential consequences: "For in the context of a constellation of inferential practices, endorsing, or committing oneself to one proposition (claimable) is implicitly endorsing or committing oneself to others which follow from it. Mastery of these inferential connections is the implicit background against which alone explicit claiming is intelligible" (AR, 17). Thus, describing a wine as tasting like a red wine (in blind wine tasting) does not make it explicit that the wine is coloured and fluid; those connections are implicit. Therefore, in making something explicit, several inferential relations are left implicit; some of these are easily determinable while others are more indeterminable—similar to the rift Adorno describes above.

By combining the sense of expressivism and inferentialism, we can therefore give meaning to the implicit commitments we undertake in engaging with the infosphere or by being in a digital ecology, not as a complete elucidation once and for all but as a gradually dawning of a whole. We can accept the indeterminate character of this relation. All processes of explication are accompanied by implicitness as well; thus, the subject making these processes explicit is not a souverain commanding a world. There is simply no position from where to capture the whole of our reality, and thus our understanding is piecemeal. However, neither is the world commanding the subjects it engages with because making it explicit is simultaneously accompanied by a conceptual understanding and critical consciousness of what it is we are committing ourselves to.

Making it Explicit: Bildung as Establishing a Semantic self-consciousness

In an interview, Brandom emphasises the above point:

> "Somebody who's worrying about inference is going to look at the concept *Boche* and say, "Well, the inference is from German nationality to barbarity and cruelty, but what about Goethe and Bach?" Having made that inference explicit, now you're in a position to be critical about it. Logic, and philosophical vocabulary more generally, is the organ of semantic self-consciousness. We can say and ask for reasons for or against something, to make explicit the inferential norms that are implicit in the concepts that we're reasoning with and that shape our thought". (Williams 2013, 386)

Leaving aside the emphasis on logic and philosophical vocabulary for a moment, two points need to be discussed. First, we can describe making it explicit as if we are adopting a critical perspective, moving from interpreting the practice in question to a perspective gradually collapsing into the perspective of the practice. This happens because the elucidative rationality of making the implicit characteristics of this practice explicit becomes an extension of the practice, not a conservative extension but a critical extension. Understanding more and more provides us with the tools to engage critically with the consequences of this practice. Second, making this explicit provides an opportunity to develop a semantic or conceptual self-consciousness (AR, 22). A plain description of the use of signs, symbols, and language provides us with a regular understanding of this use—an account of the skills needed to engage in a given practice. Brandom also terms this, following Hegel, consciousness, similar to the conscious effort or attention needed to do something. However, when using our theories, or the vocabularies referred to in the interview quote above, in connection herewith, that is, as expressive means of bringing out the inferential relations, we achieve a kind of semantic self-consciousness: "For it offers an account of a kind of consciousness, awareness in the sense of sapience, which underwrites a corresponding account of a kind of self-consciousness: semantic or conceptual self-consciousness" (AR, 35). Here, achieving the capability of expressing what is done by saying or doing something within a particular practice is actualised. Therefore, making it explicit is not only elucidating the practices—the infosphere—in which we engage. A self-consciousness of what it means for me or us as inforgs accompanies this elucidation. Bringing Brandom's and Floridi's concepts together is thus warranted, because hum-tech practices as practices with implicit norms, rules, and relations must be explicitised to understand the implications of what humans are doing as well as what are done to humans when engaging in these kinds of practices. Modelled on Brandom's concepts, therefore, the digital *Bildung* proposed here is becoming aware of what is implicit by being able to express what is done and the consequences are within hum-tech practices. To put some content into this process of making it explicit, we need a vocabulary.

For Brandom, theories or vocabularies are 'tools' for making the implicit explicit, for saying what otherwise cannot be made explicit, and thus to be able to recognise and judge what is implicit in the technological non-consciousness, that is, within the infosphere. The primary vocabulary used is philosophy and logic, and to give an example:

> "In applying the concept lion to Leo, I implicitly commit myself to the applicability of the concept mammal to him. If my language is expressively rich enough to contain conditionals, I can say that if Leo is a lion, then Leo is a mammal… That Cleo is a cephalopod is good (indeed, decisive) evidence that she is not a lion. If my language is expressively rich enough to contain negation, I can make that implicit inferential component articulating the content of the concept lion explicit by saying that if Cleo is a cephalopod, then Cleo is not a mammal". (AR, 19–20)

Thus, the vocabulary of logic can help with expressing the inferential connections and relations that different concepts within our linguistic practices are involved in. Furthermore, introducing this kind of logical vocabulary gives us the possibility of realising what we are doing when we use these concepts. Brandom (AR, 53) claims that logical vocabulary is not the only kind of vocabulary that can be used in this process. Therefore, we need an expressive, rich vocabulary for describing the many implicit inferential relations of our infosphere

or digital ecology. This might be pictured analogically to Brandom's use of logical vocabulary, and some of this will be highly relevant to understanding technological cognition. However, as part of an overall *Bildung* in Adorno's sense, we need to pay attention to less logical vocabularies as well. I will summarise this section and end the conclusion with some considerations for this.

Using Brandom, I developed a first indication of what desiderata building a notion of digital *Bildung* from a non-dualist ontology of the technological and non-technological ecology of human cognition could contain. First, I suggested delineating the commonality and differences between human and technological cognition by describing the sentience we share with animals and machinery and the sapience that is specific to us. Second, the notions of expressivity and inferentiality exemplified how to make the implicit dealings within the infosphere explicit, thereby raising awareness and consciousness of the consequences of these dealings. Third, this explicating was not to be understood as self-determination in the old sense of *Bildung*. Rather, delineating the rift between the infosphere and us, as inforgs, moves our effort from a representational to an expressive understanding of making our cognitive ecology explicit. Fourth, Brandom's notion of vocabulary was stressed as important for identifying and bringing elements within our environment to our attention. In short, we need words and concepts as pedagogical tools to become aware of the assemblages in which we engage as part of our cognitive ecology. Adopting a vocabulary is thus a means of paying attention to what we need to *say* to specify those *doings* we engage in.

Conclusion: Digital *Bildung* as Making Our Digital Lives Explicit

The argument presented here has come a long way. Instead of reiterating it let me end by presenting some thoughts on the implications of the notion of digital *Bildung* for the more practical side of education. First, the sense of experience this digital *Bildung* can be compared with best, is the kind of experience gained by the effort of inhabiting a new environment (material or immaterial). It critically develops our awareness, as we gradually understand more and more of how this environment is built and function and develop judgmental capacities for detecting and making the implicit inferential connections explicit. Second, the question of *Bildung* is not a question of ICT literacy as subject's technical versus nontechnical skills, but of understanding digital aspects of our lives as part of a general *Bildung* of subjects. The awareness needed is therefore not just *of* the world, but *within* the world. We are inhabiting and trying to appropriate a whole new environment, and we are just beginning to establish a new vocabulary of making this explicit. What elements and how could this new vocabulary be taught?

Fawns (2022, see also Biesta 2010) presents some thoughts similar to the idea of entanglement presented here but aiming at moving past a pedagogy-technology dichotomy. As *Bildung* implies a sense of indeterminateness, Fawns' notion of entangled pedagogy implies giving up understanding technology as a driver for pedagogy and pedagogy as a driver for technology. Instead, entanglement means accepting technology as part of a contextual and relational ecology, and the sense of agency tied to *Bildung* as establishing an awareness of the different elements within this ecology, involving ideally a dialogue between teachers, tech companies, students, policy makers, technological infrastructure builders etc. (Fawns 2022, 713). Thus, the *Bildung* side implies leaving a myopic focus on tech versus non-tech

skills of the individual pupil, student, or human, instead focusing on enhancing the awareness of what it means for these persons to be inhabitants within a tech-non-tech entangled world. Concretely, Fawns proposal of an entangled pedagogy would be a place to start, since it aims at a knowledge that is collective and responsive, while embracing the uncertainty of establishing an awareness of the mutual shaping of technologies, people, purposes, values in and across the different contexts.

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