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A tale of two schools: Arguments for a theory of Post-Education

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ABSTRACT

For decades, educators and academics have debated the transformative potential of technology in education, yet the promised shift has failed to materialise. Even during the pandemic-driven emergency learning period, most schools merely replicated pre-pandemic methods using technology, with traditional formats remaining dominant. This resistance to technological integration reflects a profound tension between competing educational paradigms: the Anaesthetic School —characterised by disembodied, contemplative learning and rooted in humanist values that centre the subject—, and the emerging Aesthetic School which emphasises entangled, ecological, experiences that reflects posthuman, postdigital sensibilities. At the core of this paradigm shift lies Digital Entanglement —a theoretical framework capturing the complex system of engagements between learners and digital devices, creating potentials, entrapments and interdependencies where agency becomes a process of manoeuvrability within relational assemblages.

This paper develops arguments for a theory of Post-Education that acknowledges this entanglement and its implications for learning in the Digital Technological System. It argues that our understanding of education must move beyond viewing digital technologies as mere tools, and recognise them as constitutive structures reshaping perception, action, but also cognitive processes and subjectivity. This paper proposes a series of arguments that highlight the need for a theory of Post-Education. To do so, it (1) examines the legacy of the Anaesthetic School; (2) analyses how technology is conceptualised in the classroom; (3) explore the notion of digital ontophany as a philosophical matrix for our current Technological System; and (4) develops the concept of Digital Entanglement as a way to contribute to a deeper understanding of how digital technologies are reshaping not only educational practices but the very nature of perception, action, cognition, and being in the world.

KEYWORDS

Post-Education, Digital Entanglement, Anaesthetic School, Aesthetic School, Digital Technological System, Posthumanism, Postdigital, Digital Ontophany, Embodied Cognition

Introduction

For decades, educators have debated the transformative potential of technology in education (Bayne et al., 2020, p. 26; Biesta, 2016; Cecutti et al., 2021; Elstad, 2016; Ganimian et al., 2020; Selwyn, 2016a, 2016b; Weller, 2011, 2020). The 2019-2021 pandemic provided a unique opportunity to test these ideas, as schools had to adapt to remote or hybrid learning models. Emergency Learning (Aguilera-Hermida, 2020; Hodges et al., 2020; Rahiem, 2020) pushed technology to the forefront, but the anticipated shift did not occur. Most schools used technology to replicate pre-pandemic methods (Reich, 2021), suggesting that traditional formats like textbooks and lectures remain dominant, with new media merely re-mediating them (Friesen, 2017). Moreover, even as the rise of AI in the classroom continues to challenge traditional practice (Aljemely, 2024) and it is seen as a way to extend and augment students' capabilities (Luckin & Holmes, 2016), most countries' education systems seem to continue to struggle to effectively integrate it into

teaching, learning, assessment and policy (Schiff, 2022).

This is due, I argue, to education's deep roots in humanist values (Knox, 2019) that place the subject at the centre and everything else at the periphery (Ceder, 2020). This resistance to technological integration, mirrors a profound tension between competing educational paradigms that extend beyond technological adoption. This tension manifests in what I characterise as two contrasting models of education: the Anaesthetic School and the Aesthetic School. The Anaesthetic School —named for its tendency to disregard embodiment and rely on contemplative, vicarious learning— emerged from the Mechanical Technological System (Vial, 2019) and is deeply rooted in humanist values that centre the subject while relegating everything else to the periphery (Ceder, 2020; Knox, 2019). In contrast, the emerging Aesthetic School emphasises ecological, embodied, and perceptual learning experiences, reflecting a posthuman, postdigital sensibility that recognises the agency of both human and non-human elements in education.

At the core of this paradigm shift lies what I call Digital Entanglement (Rodriguez, 2025), a theoretical framework that captures the complex system of engagements and hybridities between learners and their digital devices. This entanglement creates both potentials and entrapments, characterised by interdependencies amongst human and non-human components where agency becomes a process of manoeuvrability within relational assemblages (Barad, 2007; Fenwick, 2011).

Based on these premises, this paper develops arguments for a theory of *Post*-Education that acknowledges this entanglement and its implications for learning in the Digital Technological System. It argues that our understanding of education must move beyond viewing digital technologies as tools to support learning and recognising them as constitutive structures that reshape perception, action, and subjectivity. The paper is organised as follows: First, it examines the legacy of the Anaesthetic School, focusing on its Cartesian dualism and disembodied understanding of cognition. Second, it analyses how conceptualising technology as either sign or tool perpetuates problematic distinctions between mind and matter. Third, it explores the emergence of the Digital Technological System and the resulting ontophanic matrix —a fundamental transformation in how we relate to reality. Fourth, it develops the concept of Digital Entanglement, examining its theoretical foundations and implications for cognitive processes. Finally, it proposes a framework for *Post*-Education that bridges the Anaesthetic and Aesthetic Schools, offering a path forward that embraces the entangled nature of learning in the Digital Technological System while remaining mindful of potential entrapments. By developing this theory of *Post*-Education, this paper aims to contribute to understanding how digital technologies are reshaping not only educational practices but the very nature of learning, cognition, and being in the world.

A Tale of Two Schools

Our narrative as a species is closely linked to that of techniques (Gille, 1986). Human beings transcend the dynamic biology versus mechanics and emerge as technical hybrids (Stiegler, 1998), with language possibly being the first form off technology to define us (Mufwene, 2013). Mumford (1955), focusing on the machine as central to civilisation's development, divided human history into epochs based on technological advancements: the eotechnic (1000-1750), paleotechnic (post-1750), and neotechnic (early 20th century) (Strate & Lum, 2000). Each phase, originating in specific regions and using distinct resources, created unique production forms and specialised workers, impacting social heritage. For instance, the eotechnic phase, characterised by woodwork, fostered creativity, while the paleotechnic phase, marked by mechanisation, shifted focus to factories and new social classes. In a similar argument, Gille (1986) described the history of humankind in terms of technological systems. He defined technological systems as a set of interconnected steps of combinations that form coherent structures through levels: technical combination (coupling energy and matter), technical ensemble (combining techniques in production), and+ technical concatenation (products emerging from production stages). Examples include the pre-mechanical

Renaissance and mechanical industrial systems; and our current, emerging Digital technological System (Vial, 2019). Each one of these systems have subtle ways to impact social and individual idiosyncrasies, suggesting that the social and the material emerge together (Bayne et al., 2020). These technological differentiations subtly changed social practices. Influenced by each phase's unique ways and methods of energy utilisation and production forms, each created specialised workers and approaches that cultivated particular sets of skills while discouraging others, ultimately redrawing selected aspects of social heritage (Munford, 1955).

This cultivation of particular aspects of the social heritage is mirrored and channelled through the prioritisation of particular education arrangements (Biesta, 2009). However, a fundamental characteristic makes the transition from the mechanical to the digital systems particularly relevant: as the mechanisation of industry offloaded the physical effort of production, automation -a characteristic of the Digital Technological System- offloads the mental effort of production (Volle, 1999), in what Vial (2019) describes as the digitalisation of thought.

In spite of this, education theory, still influenced by core Cartesian dualities and its humanist heritage (Biesta, 1998; Edwards & Usher, 1994; Kakkori & Huttunen, 2010; Knox, 2016; Lewis & Kahn, 2010; Pedersen, 2010) has staunchly separated authentic inner humanness from external technology (Knox, 2019), leading to a lack a substantive engagement with (digital) technology. However, the confluence of a *post-* turn that both decentres the human and deconstruct agency; and the increased presence of digital technologies in the classroom (such as AI) is forcing the hand of educational theory to reformulate the role of human and non-human aspects of education. The salience of the hybridity between humans and technologies is mirrored both in post-human and postdigital thinking. Whilst the former invites to re-think the centrality of *Anthropos* in a landscape of continuity between the human, the natural and the cultural; the latter advocates for an understanding of human practice where the 'digital revolution' has already touched everyone and has lost all prominence (Cascone, 2000/2017).

Mark Weiser (1993), in the final years of the 20th century, proposed that, considering the trends of discreet technology and the growing prevalence of information, the next stage of computing technology would develop non-linearly. He foresaw that personal computers and workstations would become redundant, as computing access would be omnipresent: integrated into walls, worn on the wrist, and distributed for access as required. His vision might not have realised fully, since Graphic User Interface (GUI) seems to continue being the dominant paradigm in our interaction with digital devices (Holmquist et al., 2019), but computing has indeed permeated every aspect of our lives -including the classroom. Yet, as made evident by the swiping reforms about the presence of digital devices in the classroom across the world (Selwyn & Aagaard, 2021), digital technologies tend to be considered as a support tool rather than a constitutive component of learners' cognitive processes.

In contemporary educational discourse, is possible to find some evidence of this contrast in the well-known distinction between the Industrial School (Bowles & Gintis, 1976) and the Information (Kohyama, 1968; Webster, 1995/2014) and/or Knowledge (Gilbert, 2005) Society models. Both of these alternatives are highly influenced by the irruption of ICT in everyday life. Their contrast centres on a transition from a model of knowledge scarcity (the Industrial model) to one characterised by the explosion of information and information systems (the Information model) and the subsequent emphasis on knowledge creation (the knowledge model) derived from ICT-facilitated freely circulating information (Anderson, 2008). However, I argue, engaging in a type of discourse that contrast terms such as Industrial versus Information might be misleading, since it oversimplifies the discussion. This opposition tend to centre in the argument that the emergence of disruptive technologies and the changing landscape of the world of work are challenging traditional education approaches. However, a key aspect of the dissonance between the current Digital Technological system and our model of schooling resides in that, as the "old world" shifts into a "new one",

conflicting paradigms and educational narratives clash in the space of classrooms, straining the foundations of schooling, requiring a redesign not only of what or how students learn, but also a redefinition of our understanding of learning and learner. Increasingly, in this hyperconnected, extended and augmented world, educators struggle to define not only the learners' boundaries but also those of their cognitive processes (Rodriguez, 2025a). Therefore, I would like to propose two new terms to refer to this clash of paradigms. The Anaesthetic and the Aesthetic Schools. Using these terms allows me to engage in a discussion without ontological or epistemological compromises due to pre-existing conceptualisation, whilst providing a functional way to characterise a set of defining paradigms.

The school, as we know it, the Anaesthetic School (due to its tendency to disregard the body and its overreliance on contemplative, vicarious learning) emerged toward the end of what Vial (2019) calls the Mechanical Technological System. Towards the end of this system a 'fordist' model of school emerged, "where people in large numbers go at the same time, to [learn] in the same place, to a centrally devised schedule announced by the sound of a bell" (Leadbeater et al., 2005). Its main goal was that of educating the subject into the Humanist values (Knox, 2019) of exceptionalism and the human agency to impose its will and transform its environment. This school, permeated by a Western understanding of the world, is dualistic in nature (Bertucio, 2017). At the same time, influenced by a conflation between cognitive and computer science, it was permeated by the cognitivist ideas of symbolic amodal manipulation which culminated in the computational theory of the mind (Thagard, 2005). In contrast, I propose the term Aesthetic School as an alternative to current educational models, and as the model for the Digital Technological System (Vial, 2019). This approach emphasises an ecological, embodied, and perceptual learning experience, reflecting a posthuman, postdigital sensibility that recognises the agency of both human and non-human elements in education, and that the integration of digital technologies is reshaping not only our subjectivities (Fawns, 2019) but also our social practices, creating new structures of perception, action and sense-making (OECD, 2024; Stalder, 2018).

Because our perception of reality is shaped by the technological tools available to our minds at any given point in history (Vial, 2019), this dissociation between a digitised world and a classroom heavily imbued by humanist principles, in turn, creates a tension whose resolution in one way or the other (digital or analogue) seems to impact on the way students construct their performative identities (Rodriguez, 2025). Based on Vial's (2019) ideas in that "technology is […] a form where perception flows, a techno-transcendental structure that produces the conditions of reality's phenomenality" (p. 52), a *post-* perspective of education requires adopting new parameters and frameworks, but also a new theory. This theory of education in the Digital Technological System not only embraces digital phenomenality but also decentres the human subject into a distributed network of agency that considers both human and non-human as constitutive part of an entanglement (Barad, 2003; Deleuze, 1987; Rodriguez, 2021, 2025), in which "humans, furniture, animals, books, and technology are parts of educational relationality" (Ceder, 2020, p. 9).

The Legacy of the Anaesthetic School

Perhaps due to its humanist roots, the Anaesthetic school legacy has permeated educational arrangement with two fundamental characteristics: a learnified understanding of schooling; and a fundamentally disembodied understanding of cognitive processes.

Famously, Biesta (2009) argued that education has three distinct dimensions: qualification, socialisation and subjectification. Qualification is concerned with knowledge, skills and dispositions; socialisation focusses on the transmission of norms, values and traditions; and subjectification is the process of becoming an independent, unique subject. However, International examination results rankings -such as those provided by the Program for International Student Assessment (PISA) have become a tool to

prioritising the meeting of particular educational outcomes (Ceder, 2020), resulting in a "learnification" of education. The term refers to the past 20 years' increasing focus on measuring educational outcomes (Biesta, 2009). As a result, education systems across the world, taking their cue from the OECD argument that student assessment highlights what matters most in education (OECD, 2013), have focused "on academic achievement in a small and selective number of domains" (Biesta, 2015a, p. 1). For many teachers, therefore, the closest they ever come to thinking about the purpose of education is to plan how to impart specific concepts to students (Bass, 1997).

Education, however, should not be equated with mere learning, because "the point of education is never that students simply learn" (Biesta, 2020b, p. 91), yet this measurement culture has profoundly impacted educational practices at all levels (Biesta, 2009), promoting a knowledge-centred approach to education (Ceder, 2020) which, in turn, expresses itself in the classroom as an increased focus on qualification, made evident as a prioritisation of the delivery-assessment-accreditation triad. Moreover, as the focus of education shifts towards knowledge, it unintendedly migrates towards supporting the underlaying assumptions that define our theories of cognition.

Learning theories have deep historical roots and can be viewed from various perspectives (Schunk, 2008). From a philosophical perspective it is possible to distinguish a Rationalist tradition -mainly represented by Kant and Descartes- where knowledge arises from the mind and ideas originate from the working of that mind upon information acquired from the world; and an Empiricist tradition -like that of Locke, Berkely and Hume- where experience is the only form of knowledge, and the external world serves as the basis of people's impressions. From a psychological point of view, one can distinguish a Structuralist and a Functionalist tradition. The structuralist tradition studied the makeup of mental processes via introspection and the analysis of stimulus and response, whilst functionalism saw mental processes and behaviours as ways to help organisms adapt to environments (Schunk, 2008). Cognitive science (CS) origins, however, can be traced to the mid 1950s, with works by Miller (1956) on human thinking capacity and short-term memory; the initial works on artificial intelligence by McCarthy and Minsky (1955/2006); and the cognitive revolution in psychology and its interdisciplinary study of the mind that aimed at understanding the workings of the mind beyond the behaviourist postulates of stimuli and response. However, it was not until Chomsky's (1959) review of verbal behaviour (Skinner, 1957) that a more human theory of cognition started to appear (Thagard, 2005, 2021).

In spite of the early behaviourists (like Skinner) emphasis on environmental factors in learning, 1956 marked a shift towards cognitivism (Varela et al., 1991/2017) and its symbolic understanding of cognition. Led by Chomsky (1956) and McCarthy and Minsky's (1955/2006) work on symbolic systems, ideas about computation of symbolic representations became the dominant voice in cognitive science. At the same time, Bandura's (1969) early research in socially situated learning, subsequently (1977) expanded by the identification of vicarious (through observation) and enactive (through action) learning, inscribed learning within human activity but not necessarily immersed in action. Moreover, Chomsky's (1956) challenged behaviourist explanations by introducing his generative grammar theory, which centred on a recursive, transformational rule system (Wasow, 2003) that generates the underlying semantic structures. These ideas highlighting language as the basic mechanism to make sense met with Paivio's (1971) research on propositional networks. Paivio's theory proposed that knowledge is stored in verbal and visual forms: whilst concrete objects are stored visually; abstract objects and linguistic structures are stored verbally. As these ideas started to complete a turn into abstract, symbolic representations of knowledge, advances in computer science in the 1960s and 70s led to the computational theory of the mind (Putnam, 1991), which views the mind as processing mental representations of external reality (Thagard, 2005).

As the increased focus of education in the measurement of educational outcomes redirect attention to a prioritisation of knowledge, a propositional understanding of knowledge and a symbolic conceptualisation of

cognition led to particular educational configurations and arrangements (Biesta, 2009) that prioritise and understanding of learning as a schematic, abstract and disembodied as the hallmarks of the Anaesthetic School. However, it should be pointed out, critical voices are emerging, as made evident by the current debate in relation to the Science(s) of Learning (Claxton, 2024) questioning the oversimplification of learning and teaching practice.

TECHNOLOGY AS A SIGN OR A TOOL

Another challenge to the consideration of digital technologies as a constitutive part of cognitive process comes from Vygotsky's (1980) dominance in current education theory (Pischetola & Dirckinck-Holmfeld, 2020). His concepts of the zone of proximal development and mediation seems to be particularly influential in current education practice. The zone of proximal development refers to the potential learning achievable under proper instructional conditions, forming the basis of social-constructivist theory. Bruner and Wood (1976) linked this idea to instructional scaffolding, a key tenet of contemporary teaching practice. Mediation, however, is nested in Vygotsky's distinction between lower (stimuli-response) and higher (memory, writing, etc.) cognitive functions, which require mediated stimuli (tools or signs) to organise activity. In *Mind and Society* (1980), Vygotsky expanded Engels' notion of tools transforming nature to include human environments. Influenced by Marxist theory, Vygotsky saw tools and sign systems as social creations that, once internalised, transform behaviour (Cole & Wertsch, 1996). Tools are externally-oriented and designed to influence the object of activity; while signs are internally-oriented and socially rooted (Bennett, 2019). Signs and tools cannot be equated or conflated.

This distinction implies that viewing technology as a tool reduces it to an external instrument to act in the world. On the contrary, seeing it as a sign or a system of signs transforms it into a constitutive structure that "constitutes the things to which it is applied" (Van den Hoven, 2007, p. 68), and acts as a lens in relation to the way we explore and understand reality (Cardinali et al., 2009; Carr, 2008; Doidge, 2007; Kurzweil, 2005; White, 2013). According to Jones (2009), Vygotsky's concept of mediation positions language as the primary mechanism through which children process their experiences and restructure their mental frameworks. However, Barad (2003) critiques the representationalist approach for creating an artificial division between language and matter, perpetuating a Cartesian habit of mind (Barad, 2003, p. 807) that perpetuates a distinction between internal mental processes and external material reality, leading to possible misnomers in which, for example, "the terms 'learning', 'understanding', or 'acts of thinking' are synonyms for (...) thought processes" (Rata, 2021, p. 21) and, therefore, to a systematic disembodiment of the learning experience.

CARTESIANISM AS A CORE UNDERSTANDING OF TECHNOLOGY

Despite the profound phenomenological revolution brought about by digital technologies (explored in the next section), most conceptual frameworks of the Anaesthetic School remain anchored in Cartesian dualism. Although this position has been extensively critiqued across numerous disciplinary perspectives (Anderson, 2003; Barad, 2003; Bolter, 2016; Braidotti, 2013, 2016b; Braidotti et al., 2016; Chiew, 2012; Faulkner & Runde, 2013; Hacking, 2013; Herbrechter, 2018a, 2018b; Leonardi, 2012; Pischetola & Dirckinck-Holmfeld, 2020; Shapiro & Stolz, 2019; Varela et al., 1991/2017), Descartes continues to influence educational theory in the perpetuation of a persistent dualistic separation between mind and body. At a surface level, this distinction manifests itself, for example, in some scholars' suggestions that "the digital world is 'virtual' and the physical world 'real'" (Jurgenson, 2011, p. 1).

However, there is a deeper epistemological dimension. Penny (2017, 2020) contends that the

hardware-software dichotomy recapitulates the Cartesian mind-body division, and that computer sciences perpetuate this dualism through the separation of information from devices. He argues that discursive frameworks are constructed upon metaphorical foundations, and that the prevalence of Cartesian metaphors in technological discourse reflects our epistemic (Cartesian) situatedness, which privileges abstraction over concreteness and theoretical knowledge over practical skill —mirroring the discussion regarding episteme and techne. This Cartesian metaphorical understanding perpetuates the idea of "analogue bodies, digital minds" (Hacking, 2005, pp. 163-164). This epistemological positioning, Penny argues, reinforces social valorisations of abstraction and immateriality that sustain perceived hierarchies elevating ideas above material reality, thereby diminishing the significance of materiality in cognitive processes. From his perspective, technologies are fundamentally embodied constructs (exemplified by instruments such as the violin), and pre-computational artefacts facilitate the development of complex embodied skills; humans learn through corporeal being-in-the-world.

An Aesthetic awakening: Technology as a condition of possibilities

In the early 1960s, Thomas Kuhn published his groundbreaking work, *The Structure of Scientific Revolutions*, where he defined a paradigm as "universally recognised scientific achievements that, for a time, provide model problems and solutions for a community of practitioners" (Kuhn, 1962, p. xiii). According to Kuhn's theory, science evolves through periods dominated by specific models of reality, which eventually lose support and are replaced by new paradigms. This cyclical process reflects the dynamic nature of scientific progress, where old paradigms are challenged and new ones emerge to provide fresh perspectives and solutions. Michel Foucault extended Kuhn's notion of paradigms by introducing the term episteme and applying it beyond the realm of science. Foucault (1971) argued that "in any given culture and at any given moment, there is always only one episteme that defines the conditions of possibility of all knowledge, whether expressed in a theory or silently invested in a practice" (p. 191). This concept of episteme is significant because it highlights a long-standing philosophical debate about the nature of knowledge and its application, contrasting epistêmê (theory) with tekhne (practice),; and because it extends the paradigmatic approach beyond the realm of science, suggesting that cultural and historical contexts shape our understanding of knowledge and reality. Stiegler (1998) summarises this conflict between epistêmê (theory) and tekhne (practice), noting that philosophy historically separated them, devaluing technical knowledge in favour of philosophical knowledge, in spite that technics form the basis of human existence, transcending the dynamic between biology and mechanics to emerge as hybrids.

Vial (2018, 2019), following Munford (1955) and Gille (1986) descriptions of human history as a succession of technological systems, extends this exploration of the relationship between knowledge and technology, arguing that technological devices are in fact philosophical machines and generators of reality (Vial, 2019). In this light, humans emerge as anthropo-technical entities. Vial (2019) finds inspiration on Sloterdijk (2017) concept of domestication as an intrinsic aspect of human existence, and defines being as an anthropo-technical condition, immersed in a material culture where objects mediate beliefs, habits and even agencies. The questions of being and of technology, he argues, are one and the same, and the history of humans coincides with the history of technology. In this process, not only technology is involved. It is a vertical process that homogenises a series of phenomena, including technology, industry, science and design, as well as social practices, in a network of interdependencies and mutual involvement. Technological systems are, therefore, the highest, most complex concatenations that can be observed in a society, and as such they describe the social structure and identity of an era (Vial, 2019).

THE DIGITAL TECHNOLOGICAL SYSTEM AS THE IDENTITY OF OUR ERA

Gille (1986) identified that the modern technological system (which emerged from the developments of the second industrial revolution) was approaching its end. This Mechanical Technological system was

fundamentally characterised by mechanisation, intended to minimise physical labour from production processes. However, during the early 1980s, this established paradigm started to deteriorate, precipitating political and social disruption. Gille (1986) attributed this transformation to the proliferation of access to novel technological innovations (exemplified by electric household appliances) and their consequent impact on societal lifestyles. Vial (2019), however, sees informatics as the true innovation of our time, citing the development of graphical interfaces in the 1980s, the emergence of the Internet in the 1990s, and the evolution of Web 2.0 in the 2000s. These technological advancements have facilitated a revolutionary shift in informatics and networks, which he calls the 'digital revolution'. According to Vial (2019), these technologies are establishing an unprecedented technological system characterised by automation, which is still in a nascent stage, comparable to how the first watermill cogs were in relation to the Mechanical System.

Moreover, Volle (1999) argues that similarly to how mechanisation allowed humans to divest themselves of the physical exertion associated with production —thereby accelerating industrialisation—, automation, as the defining attribute of the digital technological system, would enable humans to offload the mental effort of production, or, as Vial (2019) articulates, the computerisation of thought (p. 33) is the new mechanisation of the body

DIGITAL ONTOPHANY

This transformation, however, transcends functional utility to reshape our ontological relationship with reality itself. Indeed, Vial (2019) argues that "perceiving in the digital age is to be forced to renegotiate the act of perception itself" (p. 42). This phenomenological revolution implies not only a change in what we perceive, but in the fundamental act of perception itself. As digital technologies increasingly permeate all spheres of human experience, they establish a new ontophanic matrix —a structural framework through which beings manifest and are perceived. The digital revolution thus constitutes not only a historical development but a philosophical transformation that reconfigures "how beings (ontos) appear (phaino)" (p. 42).

Digital ontophany creates unprecedented conditions for existence. This idea seems to be mirrored in Stalder's (2017) notion of the digital condition. The digital condition argues that, after the collapse of traditional institutions, emerging social movements saw in the digital new possibilities and methods for participating, negotiating meaning and establishing collective system of references. This unprecedented level of accessibility —economically, culturally, and materially— dismantled traditional barriers to participation (and meaning-making), establishing digital technologies not merely as tools through which we engage with the world, but as the very medium that constitutes our mode of being within it.

The irruption of digital technologies thus represents a comprehensive reconfiguration of existence —a transformation from being-with-technology to being-through-technology. In this digital ontophany, perception, cognition, social relations, and self-conception are increasingly mediated by and constituted through digital interfaces and networks. This shift, I argue, suggests that the digital becomes not simply a supplementary element to human experience but increasingly a fundamental condition that changes not only how we participate in the world, but the very nature of that participation and, ultimately, our mode of being itself. In Vial's (2019) words, "the phenomeno-technology of objects is therefore a form of phenomenological factitivity, for the objects technically build the scheme of possible experience that they make accessible" (Vial, 2019, p. 115).

Thus, while digital ontophany offers a revolutionary framework for understanding our mode of being in the digital age, the Anaesthetic School's continued adherence to Cartesian perspectives on technology perpetuates a problematic dissociation between digital experience and embodied existence —a dissociation that fundamentally limits our capacity to engage with the full spectrum of the entanglement with the digital

that characterises contemporary human experience.

The '*post-*'

Before focusing on *post-* Education, it is necessary to address two essential *posts*: posthumanism and postdigital. So, what does this notion of *post-* means? Braidotti (2013) refers to the "post-theoretical malaise" (p. 4) as both a recognition of new possibilities and a lack of critical models to analyse the present. Sinclair and Hayes (2018) argue that the 'post' enables writing from within rather than beyond. Carpentier & Van Bauwel (2010) see the term as capturing change and critique, linking it to Laclau's (1985/2014) notion of floating signifier, which assumes different meanings in different contexts and crosses discursive frontiers to become self-reflexive and self-critical. Badmington (2003) argues that the 'post-' is always tied to what it is 'post-ing,' never making an absolute break from its legacy but rather engaging in cultural criticism. Thus, both posthuman and postdigital do not fully move away from humanism and digital principles but establish a critical dialogue with them, as it does *post-* Education.

Post-humanism entered popular discourse with the 1982 *Time Magazine* cover awarding 'Man of the Year' to a computer (Badmington, 2003). In academia, however, it can be traced as far back Nietzsche's notion of the overhuman (Sorgner, 2009). Derrida's (1969) work brought attention to contemporary questioning of humanism and anthropocentris, like those by thinkers like Foucault and Lacan who "criticised the main humanist project of defining or universalising the subject" (Ceder, 2020, p. 47). Towards the end of the last century, works by Haraway (1991), Hayles (2000), and Graham (2002) further explored posthumanism. Posthumanist thinking can be linked to socio-material traditions (Friesen, 2018), which challenge humanist conceptions of humans as autonomous beings exercising individual agency and choice. It emerges from antihumanism and anti-anthropocentrism and questions the universal representation of man and the species hierarchy that places humans at the top (Braidotti et al., 2016), offering a new epistemology that is not anthropocentric and undermines traditional boundaries between the human, animal, and technological (Bolter, 2016).

The posthuman condition introduces a qualitative shift in thinking about the basic unit of reference for our species, polity, and relationship to other inhabitants of the planet (Braidotti, 2013), moving away from the social-constructivist approach, which distinguishes between nature and culture and proposing a continuum instead. This new paradigm, based on a monistic philosophy, rejects dualisms and addresses how advancements in science and technology blur the boundaries between the natural and cultural. Posthuman theory, therefore, emerges as a tool to rethink the basic unit of reference for humans in the bio-genetic age known as the 'anthropocene'. This posthuman nomadic subject is materialist and vitalist, embodied and embedded, and firmly. It is multifaceted and relational, and conceptualised within a monistic ontology (Braidotti, 2013). Posthumanism, therefore, is both a development of and a contrast to humanist thinking that creates spaces for the resurgence of alternative and indigenous philosophies and their notions of agency (Ceder, 2020), which tend to be less instrumental and more ecological (Cajete, 2000; Calderon, 2010; Gannon, 2009; Marsden & Royal, 2003; Mika, 2012).

The term postdigital, in the other hand, originated in the arts. Coined in 2000 by Cascone (2000/2017) following Negroponte's (1998) idea that the digital revolution is over, the postdigital aesthetic emerges from environments permeated by digital technologies but focuses on their failures (glitches, noise, errors) to remind us that control and technology are illusions. The term 'post-digital' describes either disenchantment with digital systems or a period in which our fascination with them has become historical. The 'post' in postdigital, therefore, should be understood like in post-punk, post-communism, post-feminism, and post-colonialism, as a continuation that still retains elements of what it 'posts' It is not as a state of disruption but as one where disruption has already occurred (Cramer, 2015), opposing the notion of new-media and rejecting techno-positivist innovation narratives.

The postdigital attempts to understand new relationships with the digital while recognising that such technology is already embedded in existing social practices and economic and political systems (Knox, 2019). We no longer live in a world where digital technologies are separate from natural and social life but in a messy continuum of digital and analogue, technological and non-technological, biological and informational (Jandrić et al., 2018). As the intellectual restrictions of the digital paradigm are becoming unavoidable, in that it reduces continuous reality into discrete binary units, the term postdigital addresses the current state of technology without implying a shift towards the binary logic of machines (Pepperell & Punt, 2000). This rejection of reductionism to discrete digital representation connects strongly to posthumanist ideas, such as Haraway's (1991) feminist cyborg, Barad's (2003) agential realism, and notions of embodiment and education through its links to the deconstruction of the humanist subject (Jandrić et al., 2018).

The postdigital and posthuman perspectives offer critical insights into how we understand and engage with technology and its impact on our lives. Challenging traditional boundaries and fostering new ways of thinking about our relationship with the digital and the human, both posthuman and postdigital thinking support a decentred idea of entanglement, in which entities do not exist independently but rather emerge through their interactions, or intra-actions (Barad, 2007)

Digital Entanglement: the starting point of a Theory of *Post*-Education

The concept of Digital Entanglement (Rodriguez, 2025a) reflects how understanding current educational phenomena requires not only a decentered approach but also a theoretical intertwining: Contemporary education cannot be discussed without addressing aspects of cognition, technology, and the intricate relationships between body and mind across these domains. Developing a theory of *post*-education must recognise the profound ways in which digital technologies have become constitutive aspects not only of student perception and action, but also of their cognitive processes.

DEFINING DIGITAL ENTANGLEMENT AND ITS THEORETICAL FOUNDATIONS

Digital Entanglement can be defined as the system of engagements and hybridities between users and their digital devices that create potentials and entrapments (Rodriguez, 2025). This synergy is characterised by complex hybridities and interdependencies amongst human and nonhuman components, creating an active flow in which agency becomes a process of manoeuvrability within relational assemblages (Barad, 2007; Fenwick, 2011).

The idea that the mind extends in loops into the world as it materially engages with it is not new. Discussing knapping (the art of striking rock to shape them into tools or weapons), Malafouris (2013) famously wondered if there was a way to clearly draw a line where the knapper finishes and the stone tool begins as a way to interrogate the boundaries of the mind. This idea is echoed in the work of Ingold (2000/2021), who referred to the synergy between practitioner, tool, and materials in his discussion of hand sawing. While these theories address material engagement in the physical world, Digital Entanglement operates under a different set of properties. When confronted with cognitive tasks mediated by digital devices, users construct malleable artefacts that help them transition between the device and their cognitive dynamic (Rodriguez, 2025b). This mechanism resembles material engagement but operates under the influence of digital ontophany rather than the governance of physical laws. Digital artefacts possess unique properties (Rodriguez, 2025a) that transform the traditional dynamics of embodiment and material engagement.

Digital Entanglement, thus, puts forward an *Umwelt* (in the sense of a world as it is experienced by a particular organism - (Von Uexküll, 1934/2013) that imbues dexterity with a unique set of qualities. It creates conditions of possibility where students and their devices become entangled in a dynamic coupling that

redefines both, resulting in a particular ontophanic resonance that impacts intra-organismic dynamics (Raja, 2018). Digital Ontophany creates a series of progressive entanglements that culminate with the digital emerging as a place where the world and the body meet. Although Digital Entanglement reproduces general strategies of material engagement (Malafouris, 2013) and correspondence (Ingold, 2013), it engages in a unique ontophanic resonance (Vial, 2019; Raja, 2018) that impacts intra-organismic dynamics. This critical reading suggests that Digital Entanglement represents a change of *locus*, but not one of *modus* in relation to generalised dynamics of embodiment and material engagement. We are in the world and of the world we inhabit, even when that world is digital.

TOWARDS A THEORY OF POST-EDUCATION

If "modernity has constructed us as reasoning internalists – isolated masterful individuals in a world of objects upon which we act" (Penny, 2017, p. 276), then we must leave behind the Cartesian dualism of mind and body and find our way to understanding intelligence as a situated skill. This means recovering "the essence of skill, as both practical knowledge and knowledgeable practice" (Ingold, 2000/2021, p. 20). In the process of skilled living-in-the-world, students create 'temporary Cyborgian unions' (Penny, 2017) that change their relationship to the world by ontophanic resonance. As agency is distributed between the learner and the digital device, it is extended by the new affordances gained by the distribution.

The concept of *Post*-Education, therefore, emerges as a critical response to the limitations of traditional educational frameworks in addressing the profound entanglement between learners and digital technologies in contemporary educational settings. Rather than representing a complete break from established educational theories, *Post*-Education adopts a critical position from within that challenges foundational assumptions while maintaining dialogue with existing frameworks. At its core, *Post*-Education acknowledges the complex Digital Entanglement that characterises learning in the Digital Technological System. This entanglement creates a system where learners and their digital devices form complex hybridities and interdependencies that reshape the very nature of cognition, perception, and action (Rodriguez, 2025a). The digital is not merely an adjunct to educational practice but increasingly constitutive of it. Moreover, *Post*-Education embraces onto-epistemology (Barad, 2007), understanding knowing and being/doing as inseparable, and recognising an intrinsic responsibility in the becomings of the world, operating in a landscape of flat ontologies where relata are defined by intra-actions rather than inherent qualities (Barad, 2007). This re-consideration brings forward important implications for agency, as properties emerge from mutual intra-penetration, and students are by definition extended and augmented by their entanglement with their digital devices.

The theory aims to move beyond the Cartesian dualism that has dominated educational thought, adopting instead a monistic philosophy that sees mind and body as two aspects of the same substance (Dahlbeck, 2016; Spinoza, 1677/2020). This philosophical shift enables an understanding of the extension of both cognition and embodiment into the digital realm not as separate processes but as an integrated phenomenon —a particular form of enculturated (Menary & Gillett, 2022) body-readiness (Rodriguez, 2025a) that emerges from engagements with digital environments.

Post-Education, therefore, understands that participants are enculturated according to the cognitive tools they use, and that they think with and as the world they inhabit. In this digital condition, students do not merely use digital technologies; they correspond with them in a process where both the world and the body meet, engage, and drift. The digital becomes not only a structure of perception but also one of action, creating a digital plane where the traditional boundaries between subject and object, human and technology, dissolve into a complex system of mutual constitution.

By bridging the Anaesthetic and Aesthetic Schools, *Post*-Education offers a theoretical framework that embraces the entangled nature of learning in the Digital Technological System while remaining mindful of

potential entrapments. It provides a nuanced perspective on the complex interplay between technology, cognition, and embodied experience in the digital age, recognising that students not only think *with* digital artefacts but (increasingly) *like* them.

Conclusion: Bridging the Anaesthetic and Aesthetic Schools

The tension between the Anaesthetic and Aesthetic Schools represents a fundamental clash of paradigms in contemporary education. The Anaesthetic School, with its humanist roots, Cartesian dualism, and cognitivist approach, has dominated educational landscapes for generations. It emerged toward the end of the Mechanical Technological System and is characterised by its tendency to disregard embodiment, relying instead on contemplative, vicarious learning. Its legacy has permeated educational arrangements with a learnified understanding of schooling and a fundamentally disembodied conceptualisation of cognitive processes. In contrast, the Aesthetic School, aligned with the Digital Technological System, offers an ecological, embodied, and perceptual learning experience that reflects a posthuman, postdigital sensibility. This approach recognises the agency of both human and non-human elements in education and acknowledges that the integration of digital technologies is reshaping not only our subjectivities but also our social practices, creating new structures of perception, action, and sense-making.

Digital Entanglement emerges as the conceptual bridge between these two paradigms. It does not simply represent a rejection of the Anaesthetic tradition, but rather a transformative engagement with it —a "post-ing" that critiques while maintaining a dialogue. The concept of Digital Entanglement illuminates how the digital is not merely an auxiliary component to educational practice but a constitutive of it.

As our educational institutions navigate the transition from the Anaesthetic to the Aesthetic School, Digital Entanglement provides a theoretical framework for understanding the profound ways in which digital technologies have become constitutive of student cognition and action. Through the lens of Digital Entanglement, we can better comprehend how students' identities, cognitive processes, and embodied experiences are increasingly shaped by their interactions with digital technologies. In this context, the digital becomes not simply a tool for perceiving the world but also a structure for acting within it. This entanglement challenges the dualistic separation of mind and body, subject and object, human and technology that has characterised the Anaesthetic School.

The practical operationalisation of *Post*-Education requires educators to fundamentally reconsider traditional pedagogical approaches. Rather than viewing digital technologies as tools for content delivery, educators must recognise them as constitutive elements of students' cognitive processes and identity formation. This shift demands new assessment methods that recognise distributed cognition (Hutchins, 1995) and the inseparability of entangled learners from their digital environments. In practical terms, educators might design learning experiences that explicitly engage with the entangled nature of digital-human interaction —for example, through reflective practices that help students develop metacognitive awareness of their digital entanglement, collaborative projects that leverage and/or restrict device usage, and assessment approaches that evaluate not just what students know but how they navigate and negotiate meaning within digital-material assemblages. Professional development must similarly evolve beyond technical training to foster educators' understanding of digital ontophany and their capacity to guide students through the complex ethical dimensions of entangled existence.

A crucial dimension of *Post*-Education practice involves educators developing awareness of when and how to deliberately create or limit digital entanglement, recognising that different learning objectives may require different degrees of technological integration. This deliberate orchestration of entanglement requires careful consideration of assessment practices, as evaluation methods must align with the embodied realities in which the learning occurs. Assessments of entangled activities should acknowledge the distributed nature of cognition and the unique affordances of human-technology assemblages, while evaluations of 'detangled'

work must recognise the distinctly different embodied responses and cognitive processes at play when students operate without digital extensions. By consciously distinguishing between these modalities, educators can create nuanced learning environments that neither uncritically embrace complete digital immersion nor clings to Anaesthetic notions of cognition, instead cultivating students' ability to move fluidly between different states of entanglement as appropriate to different contexts and purposes.

Despite its theoretical promise, the Aesthetic School and Digital Entanglement bring significant challenges that demand critical attention. The blurring of boundaries between cognition and technology risks reinforcing rather than disrupting existing power structures, as corporate digital ecosystems increasingly shape and commodify learning experiences (Ferreira et al., 2020). Digital entanglement may intensify rather than ameliorate educational inequalities, creating new forms of exclusion for those with limited access to literacy in digital environments (McConnaughey et al., 1998) or further impact the existing issues associated with health and wellbeing in relation with screen time (Cullen et al., 2024). Furthermore, the entanglement paradigm raises profound questions about autonomy and agency (Bolton, 2013) —as cognitive processes become increasingly distributed across human-technological networks, traditional notions of individual responsibility and achievement require reconsideration. Perhaps most significantly, the very closeness of digital entanglement may undermine critical distance, making it difficult for learners to question or resist the values and assumptions embedded in the digital systems with which they are entangled. A truly transformative *Post*-Education must therefore maintain a dialectical tension between embracing entanglement and preserving the capacity for critical engagement with it.

The transition from the Anaesthetic to the Aesthetic School, therefore, is not simply a matter of substituting one educational paradigm for another, but of recognising and engaging with the profound ways in which digital technologies have become entangled with our cognitive and embodied experiences. *Post*-Education, in this sense, represents not a departure from educational theory but a critical engagement with it—a recognition that in the Digital Technological System, education must acknowledge and embrace the entangled nature of student experience.

Notes on contributor

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References

Aguilera-Hermida, A. P. (2020). College students' use and acceptance of emergency online learning due to COVID-19. International Journal of Educational Research Open, 1, 100011. https://doi.org/10.1016/j.ijedro.2020.100011

Aljemely, Y. (2024). Challenges and best practices in training teachers to utilize artificial intelligence: a systematic review. Frontiers in Education,

Anderson, M. L. (2003). Embodied cognition: A field guide. Artificial intelligence, 149(1), 91-130.

https://doi.org/10.1016/S0004-3702(03)00054-7
Anderson, R. E. (2008). Implications of the information and knowledge society for education. In J. Voogt & G. Knezek (Eds.), International handbook of information technology in primary and secondary education (pp. 5-22). https://doi.org/https://doi.org/10.1007/978-0-387-73315-9_1
Badmington, N. (2003). Theorizing Posthumanism [Review]. Cultural Critique, 53(1), 10-27. https://doi.org/10.1353/cul.2003.0017
Bandura, A. (1969). Principles of behavior modification. Holt, Rinehart, & Winston.
Bandura, A. (1977). Social learning theory. Prentice Hall.
Barad, K. (2003). Posthumanist performativity: toward an understanding of how matter comes to matter. Signs: Journal of Women in Culture and Society, 28(3), 801-831. https://doi.org/10.1086/345321
Barad, K. (2007). Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning. Duke University Press.
Bass, R. V. (1997). The purpose of education. The Educational Forum, 61(2), 128-132.
Bayne, S., Sinclair, C., Evans, P., Ewins, R., Knox, J., Lamb, J., Macleod, H., O'Shea, C., Ross, J., & Sheail, P. (2020). The manifesto for teaching online. MIT Press.
Bennett, L. A. (2019). Technology in the classroom: Exploring the experience of secondary students using activity theory. [Doctoral thesis, Te Herenga Waka – Victoria University of Wellington]. Open Access Te Herenga Waka – Victoria University of Wellington.
Bertucio, B. (2017). The Cartesian Heritage of Bloom's Taxonomy. Studies in Philosophy and Education, 36(4), 477-497. https://doi.org/10.1007/s11217-017-9575-2
Biesta, G. (2009). Good education in an age of measurement: On the need to reconnect with the question of purpose in education. Educational Assessment, Evaluation and Accountability (formerly: Journal of Personnel Evaluation in Education), 21(1), 33-46. https://doi.org/https://doi.org/10.1007/s11092-008-9064-9
Biesta, G. (2015a). What is education for? On good education, teacher judgement, and educational professionalism. European Journal of education, 50(1), 75-87. https://doi.org/https://doi.org/10.1111/ejed.12109
Biesta, G. (2016). ICT and education beyond learning. In Digital expectations and experiences in education (pp. 29-43). Springer. https://doi.org/https://doi.org/10.1007/978-94-6300-648-4_2
Biesta, G. (2020b). Risking Ourselves in Education: Qualification, Socialization, and Subjectification Revisited [Article]. Educational Theory, 70(1), 89-104. https://doi.org/10.1111/edth.12411
Biesta, G. J. (1998). Pedagogy without humanism: Foucault and the subject of education. Interchange, 29, 1-16.
Bolter, J. D. (2016). Posthumanism. The international encyclopedia of communication theory and philosophy, 1-8.
Bolton, M. S. (2013). Digital parasites: Reassessing notions of autonomy and agency in posthuman subjectivity. Theoria and Praxis: International Journal of Interdisciplinary Thought, 1(2).
Bowles, S., & Gintis, H. (1976). Schooling in capitalist America : educational reform and the contradictions of economic life. Routledge and Kegan Paul.
Braidotti, R. (2013). The posthuman. Polity Press.
Braidotti, R. (2016b). Anthropos redux: A defence of monism in the anthropocene epoch. Frame: Tijdschrift voor Literatuurwetenschap, 29(2), 29-48.
Braidotti, R., Prayag, R., Ferrando, F., Ahluwaila, P., Sengupa, S., & Asberg, C. (2016). Critical posthumanism : planetary futures (D. Banerji & M. R. Paranjape, Eds.). Springer.
Cajete, G. (2000). Native science: Natural laws of interdependence. Clear Light Publishers.
Calderon, D. (2010). Indigenous metaphysics: Challenging Western knowledge organization in social studies curriculum University of California, Los Angeles].
Cardinali, L., Frassinetti, F., Brozzoli, C., Urquizar, C., Roy, A. C., & Farnè, A. (2009, Jun 23). Tool-use induces morphological updating of the body schema. Current biology, 19(12), R478-R479. https://doi.org/10.1016/j.cub.2009.05.009
Carpentier, N., & Van Bauwel, S. (2010). The Politics of the Prefix: From "Post" to "Trans"(and Back)? Trans-Reality Television: The Transgression of Reality, Genre, Politics, and Audience, 297.
Carr, N. (2008). Is Google making us stupid? Yearbook of the National Society for the Study of Education, 107(2), 89-94. https://doi.org/https://doi.org/10.1111/j.1744-7984.2008.00172.x
Cascone, K. (2000/2017). The aesthetics of failure:"Post-digital" tendencies in contemporary computer music. In Electronica, Dance and Club Music (pp. 97-103). Routledge. https://doi.org/http://dx.doi.org/10.1162/014892600559489
Cecutti, L., Chemero, A., & Lee, S. W. S. (2021, 2021/08/01). Technology may change cognition without necessarily

harming it. Nature Human Behaviour, 5(8), 973-975. https://doi.org/10.1038/s41562-021-01162-0
Ceder, S. (2020). Towards a posthuman theory of educational relationality. Routledge.
Chiew, F. (2012). Neuroplasticity as an Ecology of Mind A Conversation with Gregory Bateson and Catherine Malabou. Journal of Consciousness Studies, 19(11-12), 32-54.
Chomsky, N. (1956). Syntactic structures. Massachusetts Institute of Technology.
Chomsky, N. (1959). A Review of BF Skinner's Verbal Behavior. Language, 35(1), 26-58.
Claxton, G. (2024, Oct 22, 2024). The Corruption of Science and The Practice of Teaching. https://aecnz.substack.com/p/the-corruption-of-science-and-the
Cole, M., & Wertsch, J. V. (1996). Beyond the individual-social antinomy in discussions of Piaget and Vygotsky. Human development, 39(5), 250-256. https://doi.org/https://doi.org/10.1159/000278475
Cramer, F. (2015). What is 'Post-digital'? In Postdigital aesthetics (pp. 12-26). Springer. https://doi.org/https://doi.org/10.1057/9781137437204_2
Cullen, J., Muntz, A., Marsh, S., Simmonds, L., Mayes, J., O'Neill, K., & Duncan, S. (2024). Impact of digital screen use on health and wellbeing of children and adolescents: A narrative review. New Zealand Journal of Physiotherapy, 52(1), 62–77-62–77. https://doi.org/10.26635/6965.6565
Dahlbeck, J. (2016). Spinoza and education: Freedom, understanding and empowerment. Routledge.
Deleuze, G. (1987). A thousand plateaus : capitalism and schizophrenia. University of Minnesota Press.
Derrida, J. (1969). The ends of man. Philosophy and phenomenological research, 30(1), 31-57. https://doi.org/https://doi.org/10.2307/2105919
Doidge, N. (2007). The brain that changes itself: Stories of personal triumph from the frontiers of brain science. Penguin.
Edwards, R., & Usher, R. (1994). Disciplining the subject: the power of competence. Studies in the Education of Adults, 26(1), 1-14.
Elstad, E. (2016). Digital expectations and experiences in education. Springer.
Faulkner, P., & Runde, J. (2013). Technological objects, social positions, and the transformational model of social activity. MIS quarterly, 803-818.
Fawns, T. (2019). Postdigital education in design and practice. Postdigital Science and Education, 1(1), 132-145. https://doi.org/https://doi.org/10.1007/s42438-018-0021-8
Fenwick, T. J. (2011). Emerging approaches to educational research : tracing the sociomaterial. Routledge.
Ferreira, G., Rosado, L., Lemgruber, M., & Carvalho, J. (2020). Metaphors we're colonised by? The case of data-driven educational technologies in Brazil. Learning, Media and Technology, 45(1), 46-60. https://doi.org/10.1080/17439884.2019.1666872
Foucault, M. (1971). The order of things: an archaeology of the human sciences (1st American ed. ed.). Pantheon Books.
Friesen, N. (2017). The Textbook and the Lecture : Education in the Age of New Media. Johns Hopkins University Press.
Ganimian, A. J., Hess, F., & Vegas, E. (2020). Realizing the promise: How can education technology improve learning for all. Brookings Institution.
Gannon, S. (2009). Relationality and the art of becoming. In B. D. S. & Gannon (Eds.), Pedagogical encounters (pp. 69-88). Peter Lang.
Gilbert, J. (2005). Catching the knowledge wave? : the knowledge society and the future of education. NZCER Press.
Gille, B. (1986). The history of techniques. Gordon and Breach Science Publishers New York.
Graham, E. L. (2002). Representations of the post/human: monsters, aliens and others in popular culture. Manchester University Press.
Hacking, I. (2005). The Cartesian vision fulfilled: analogue bodies and digital minds. Interdisciplinary Science Reviews, 30(2), 153-166. https://doi.org/https://doi.org/10.1179/030801805X25963
Hacking, I. (2013). The Cartesian vision fulfilled: analogue bodies and digital minds. Interdisciplinary Science Reviews, 30(2), 153-166. https://doi.org/10.1179/030801805x25963
Haraway, D. (1991). Simians, Cyborgs, and Women : The Reinvention of Nature. Taylor & Francis Group.
Hayles, N. K. (2000). How we became posthuman: Virtual bodies in cybernetics, literature, and informatics. IOP Publishing.
Herbrechter, S. (2018a). Posthumanism and the ends of education. On Education. Journal for Research and Debate, 1(2). https://doi.org/10.17899/on_ed.2018.2.2

Herbrechter, S. (2018b). Posthumanist Education? In International Handbook of Philosophy of Education (pp. 727-745). Springer.
Hodges, C. B., Moore, S., Lockee, B. B., Trust, T., & Bond, M. A. (2020). The difference between emergency remote teaching and online learning.
Holmquist, L. E., Zuckerman, O., Ballagas, R., Ishii, H., Ryokai, K., & Zhang, H. (2019). The future of tangible user interfaces. 2019 CHI Conference on Human Factors in Computing Systems, Glasgow.
Hutchins, E. (1995). Cognition in the wild. MIT press.
Ingold, T. (2000/2021). The perception of the environment : essays on livelihood, dwelling and skill. Routledge.
Ingold, T. (2013). Making : anthropology, archaeology, art and architecture. Routledge.
Jandrić, P., Knox, J., Besley, T., Ryberg, T., Suoranta, J., & Hayes, S. (2018, 2018/08/24). Postdigital science and education. Educational Philosophy and Theory, 50(10), 893-899. https://doi.org/10.1080/00131857.2018.1454000
Jones, P. E. (2009, 2009/04/01/). From 'external speech' to 'inner speech' in Vygotsky: A critical appraisal and fresh perspectives. Language & Communication, 29(2), 166-181. https://doi.org/10.1016/j.langcom.2008.12.003
Jurgenson, N. (2011). Digital dualism versus augmented reality. The Society Pages, 24.
Kakkori, L., & Huttunen, R. (2010). The Gilligan-Kohlberg controversy and its philosophico-historical roots. Encyclopaedia of philosophy of education, 20.
Knox, J. (2016). Posthumanism and the MOOC: opening the subject of digital education. Studies in Philosophy and Education, 35(3), 305-320. https://doi.org/10.1007/s11217-016-9516-5
Knox, J. (2019). What does the 'postdigital'mean for education? Three critical perspectives on the digital, with implications for educational research and practice. Postdigital Science and Education, 1(2), 357-370. https://doi.org/https://doi.org/10.1007/s42438-019-00045-y
Kohyama, K. (1968). Introduction to information society theory. Tokyo, Japan: Chuo Koron.
Kuhn, T. S. (1962). The structure of scientific revolutions. University of Chicago Press.
Kurzweil, R. (2005). The singularity is near: When humans transcend biology. Penguin.
Laclau, E., & Mouffe, C. (1985/2014). Hegemony and socialist strategy: Towards a radical democratic politics (Vol. 8). Verso Books.
Leadbeater, C., Education, G. B. D. f., Skills, & Leadership, N. C. f. S. (2005). The Shape of Things to Come: Personalised Learning Through Collaboration. DfES Publications.
Leonardi, P. N., B.; Kallinikos, J. (2012). Materiality and organizing : social interaction in a technological world (First edition. ed.). Oxford University Press.
Lewis, T., & Kahn, R. (2010). Education out of bounds: Reimagining cultural studies for a posthuman age. Springer.
Luckin, R., & Holmes, W. (2016). Intelligence unleashed: An argument for AI in education.
Malafouris, L. (2013). How things shape the mind. MIT press.
Marsden, M., & Royal, T. A. C. (2003). The woven universe: selected writings of Rev. Māori Marsden. Estate of Rev. Ma ōri Marsden.
McCarthy, J., Minsky, M. L., Rochester, N., & Shannon, C. E. (1955/2006). A proposal for the Dartmouth Summer Research Project on Artificial Intelligence, august 31, 1955. AI magazine, 27(4), 12-12. https://doi.org/https://doi.org/10.1609/aimag.v27i4.1904
McConnaughey, J., Lader, W., & Chin, R. (1998). Falling through the net II: new data on the digital divide', National Telecommunications and Information Administration. Department of Commerce, US Government, Washington, DC.
Menary, R., & Gillett, A. (2022, Apr). The Tools of Enculturation. Top Cogn Sci, 14(2), 363-387. https://doi.org/10.1111/tops.12604

Mika, C. T. H. (2012). Overcoming 'being'in favour of knowledge: The fixing effect of 'mātauranga'. Educational philosophy and theory, 44(10), 1080-1092. https://doi.org/https://doi.org/10.1111/j.1469-5812.2011.00771.x
Miller, G. A. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. Psychological review, 63(2), 81.
Mufwene, S. S. (2013). The emergence of complexity in language: An evolutionary perspective. In Complexity perspectives on language, communication and society (pp. 197-218). Springer.
Mumford, L. (1955). Technics And Civilization. Routledge & Kegan Paul.
Negroponte, N. (1998). Beyond digital. Wired, 6(12), 288.
OECD. (2013). Synergies for better learning: an international perspective on evaluation and assessment. OECD

Publishing,. https://doi.org/10.1787/9789264190658-en
OECD. (2024). The impact of digital technologies on well-being: Main insights from the literature (O. Publishing, Ed.). OECD Publishing. https://doi.org/10.1787/cb173652-en
Paivio, A., & Csapo, K. (1971). Short-term sequential memory for pictures and words. Psychonomic Science, 24(2), 50-51. https://doi.org/10.3758/BF03337887
Pedersen, H. (2010). Is 'the posthuman'educable? On the convergence of educational philosophy, animal studies, and posthumanist theory. Discourse: Studies in the cultural politics of education, 31(2), 237-250.
Penny, S. (2017). Making sense: Cognition, computing, art, and embodiment. MIT Press.
Penny, S. (2020). Making as critical interrogation–An autobiographical reflection. Craft Research, 11(2), 295-303. https://doi.org/10.1386/crre_00030_1
Pepperell, R., & Punt, M. (2000). The postdigital membrane: Imagination, technology and desire. Intellect Books.
Pischetola, M., & Dirckinck-Holmfeld, L. (2020). Enactivism and digital learning platforms. Twelfth International Conference On Networked Learning, Kolding, Denmark. https://www. networkedlearning. aau. dk,
Putnam, H. (1991). Representation and Reality. MIT Press.
Rahiem, M. D. (2020). The emergency remote learning experience of university students in Indonesia amidst the COVID-19 crisis. International Journal of Learning, Teaching and Educational Research, 19(6), 1-26. https://doi.org/http://dx.doi.org/10.26803/ijlter.19.6.1
Raja, V. (2018). A theory of resonance: Towards an ecological cognitive architecture. Minds and Machines, 28(1), 29-51. https://doi.org/10.1007/s11023-017-9431-8
Rata, E. (2021). The Curriculum Design Coherence Model in the Knowledge−Rich School Project. Review of Education. https://doi.org/https://doi.org/10.1002/rev3.3254
Reich, J. (2021). The Paradox of Pandemic Education: We Changed Everything to Be Mostly the Same. Can Connected Learning Offer a New Way Forward? Connected Learner Alliance. https://clalliance.org/blog/the-paradox-of-pandemic-education-we-changed-everything-to-be-mostly-the-same-can-connected-learning-offer-a-new-way-forward/
Rodriguez, C. (2021). In search of the margin spaces. Pacific Journal of Technology Enhanced Learning, 3(1), 34-36. https://doi.org/https://doi.org/10.24135/pjtel.v3i1.101
Rodriguez, C. (2025). Wordle, a game of five letters: A microphenomenological inquiry into thinking with digital objects. [Unpublished manuscript].
Rodriguez, C. (2025a). Digital Entanglement: A micro phenomenological study of learning with digital devices in a New Zealand secondary school [Doctoral thesis, Te Ara Putama – Auckland University of Technology – Unpublished Manuscript].
Schiff, D. (2022). Education for AI, not AI for education: The role of education and ethics in national AI policy strategies. International Journal of Artificial Intelligence in Education, 32(3), 527-563.
Schunk, D. H. (2008). Learning theories : an educational perspective (Fifth edition. ed.). Pearson/Merrill Prentice Hall.
Selwyn, N. (2016a). Is technology good for education? Polity.
Selwyn, N. (2016b). Education and technology: Key issues and debates. Bloomsbury Publishing.
Selwyn, N., & Aagaard, J. (2021). Banning mobile phones from classrooms—An opportunity to advance understandings of technology addiction, distraction and cyberbullying. British journal of educational technology, 52(1), 8-19. https://doi.org/10.1111/bjet.12943
Shapiro, L., & Stolz, S. A. (2019). Embodied Cognition and Its Significance for Education. Theory and Research in Education, 17(1), 19-39. https://doi.org/10.1177/1477878518822149

Sinclair, C., & Hayes, S. (2018, 2019/04/01). Between the Post and the Com-Post: Examining the Postdigital 'Work' of a Prefix. Postdigital Science and Education, 1(1), 119-131. https://doi.org/10.1007/s42438-018-0017-4
Skinner, B. F. (1957). Verbal behavior. New York: Appleton-Century-Crofts.
Sloterdijk, P. (2017). Not saved: essays after Heidegger. John Wiley & Sons.
Sorgner, S. L. (2009). Nietzsche, the overhuman, and transhumanism. Journal of Evolution and Technology, 20(1), 29-42.
Spinoza, B. (1677/2020). Spinoza's Ethics. Princeton University Press.
Stalder, F. (2018). The Digital Condition. Polity Press.
Stiegler, B. (1998). Technics and time: The fault of Epimetheus (Vol. 1). Stanford University Press.
Strate, L., & Lum, C. M. K. (2000). Lewis Mumford and the ecology of technics. Atlantic Journal of Communication,

8(1), 56-78.
Thagard, P. (2005). Mind: Introduction to cognitive science. MIT press.
Thagard, P. (2021). Cognitive Science. The Stanford Encyclopedia of Philosophy. https://plato.stanford.edu/archives/spr2023/entries/cognitive-science/
Van den Hoven, J. (2007). ICT and value sensitive design. The Information Society: Innovation, Legitimacy, Ethics and Democracy In honor of Professor Jacques Berleur sj: Proceedings of the Conference “Information Society: Governance, Ethics and Social Consequences”, University of Namur, Belgium 22–23 May 2006,
Varela, F., Rosch, E., & Thompson, E. (1991/2017). The embodied mind : cognitive science and human experience (Revised edition. ed.). MIT Press.
Vial, S. (2018). Ontophany Theory: Historical Phenomenology of Technology and the Digital Age. In Bernadette Bensaude Vincent, X. Guchet, & S. Loeve (Eds.), French Philosophy of Technology: Classical Readings and Contemporary Approaches. (pp. 385-400). Springer Verlag. https://doi.org/http://dx.doi.org/10.1007/978-3-319-89518-5_23
Vial, S. (2019). Being and the Screen: How the Digital Changes Perception. Published in one volume with A Short Treatise on Design. MIT Press.
Volle, M. (1999). Economie des nouvelles technologies: Internet, télécommunications, informatique, audiovisuel, transport aérien. Economica.
Von Uexküll, J. (1934/2013). A foray into the worlds of animals and humans: With a theory of meaning (Vol. 12). U of Minnesota Press.
Vygotsky, L. S. (1980). Mind in society: The development of higher psychological processes. Harvard University Press.
Wasow, T. (2003). Generative grammar. In M. Aronoff & J. Roes-Miller (Eds.), The handbook of linguistics (pp. 295-318). Blackwell publishers.
Webster, F. (1995/2014). Theories of the information society. Routledge.
Weiser, M. (1993). Hot topics-ubiquitous computing. Computer, 26(10), 71-72. https://doi.org/10.1109/2.237456
Weller, M. (2011). The digital scholar: How technology is transforming scholarly practice. A&C Black.
Weller, M. (2020). 25 Years of Ed Tech. AU Press, Athabasca University. https://doi.org/10.15215/aupress/9781771993050.01
White, G. K. (2013). Digital fluency: Skills necessary for learning in the digital age.
Wood, D., Bruner, J. S., & Ross, G. (1976, Apr). The role of tutoring in problem solving. J Child Psychol Psychiatry, 17(2), 89-100. https://doi.org/10.1111/j.1469-7610.1976.tb00381.x