

Tomorrow's Networked Posthumans: Reflections on Artificial Intelligence and the Digital Well-Being of Young Children

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Abstract

While networked learning (NL) is most often associated with adult learning and professional work practices, examining the “ontogenetic development” of children in the context of today’s smart global networks is also relevant to NL research (Rodríguez-Illera & Barberà in NLEC et al., 2021). In this paper, we ask: What child-technology relations are being forged in our posthuman era of Artificial Intelligence (AI), big data and global networks? We begin by scoping the intensifying presence of networked, smart technologies in the home life of infants, toddlers and preschoolers; we examine recent policy frameworks regarding AI, ethics and children. We then turn to two phenomenological philosophers, Michel Serres and Bernard Stiegler to consider how their thinking about digital technologies might provide insight for parents and educators as they endeavour to make the best “smart” technology choices for children. Finally, we consider the implications of our phenomenological reflections on today’s young posthumans for networked learning and postdigital education.

Keywords

Artificial Intelligence, AI Ethics, Early Childhood, Digital Well-Being, Phenomenology, Posthuman, Networked Learning

Introduction

In a recent issue of *Educational Philosophy and Theory* devoted to the oeuvre of French philosopher of technology Bernard Stiegler, Anna Kouppanou (2020) asks, “What is in a child’s hand?” Her question aims to expand Stiegler’s writings on childhood and specifically what childhood means in the context of his thesis that hominization unfolds via a child’s participation with and through their technologized milieu. The human hand, Kouppanou suggests, is the infant’s primary entry point into the technical and thus into the human. As the infant explores their sociomaterial world and increasingly tunes into, establishes and refines their prosthetic, co-extensive relations with the “ready-to-hand”—i.e., the available technical objects in their environment—they are simultaneously inaugurating their human being—or better, their posthuman becoming.

What is in a child’s hand *today*? Michel Serres (2015), another French philosopher, offers a provocative answer to this question. We will turn to his response shortly. We begin by situating our study of children’s early entanglements with digital technologies in networked learning (NL) research. We briefly survey the intensifying presence of networked, smart technologies in the home life of infants, toddlers and preschoolers with a focus on what is ready-to-hand in their lifeworld; we examine recent policy frameworks regarding AI, ethics and children. We then look to Michel Serres and Bernard Stiegler to consider how their differing phenomenological analyses of contemporary child-technology relations might provide insight for parents and educators as they endeavour to make the best “smart” technology choices for children or young posthumans. Finally, we consider the implications of our (post)phenomenological reflections on “what is in a child’s hand today?” for networked learning and postdigital education.

Networked Learning, Childhood and Artificial Intelligence

Networked learning (NL) is a field of research more usually associated with *adult* work and learning practices in the context of evolving sociotechnical networks. However, as Rodríguez-Illera and Barberà (in Networked Learning Editorial Collective (NLEC) et al., 2021) recently suggest, NL ought to also consider the “ontogenetic development” of its primary constituents and should thus attend to how today’s “tectonic socio-technological changes” (p. 326) may be affecting children and youth. For example, as a child grows up extending their being, thinking and doing with increasingly complex artificially intelligences and neural networks, what habits of mind will prove most productive, most creative, most conducive to learning; what senses of self may be constituted in the deepening imbrications of human-nonhuman intelligences, what reconfigurations of community, of politics, of culture, may unfold? Thus understanding “what [technologies are] in a child’s hand today” may provide insight into the work possibilities and learning needs of tomorrow’s posthumans who are currently being raised in a churning ocean of intensifying human-AI relational networks.

Background

Infants today are increasingly born into a world equipped with intelligent devices: smart cribs, blankets and change pads, video monitors with night vision and motion detection, and even socks and onesies that stream temperature, heart rate and oxygen levels, sleep activity and body position data to their parents’ smartphones. This networked abundance of AI technologies in the nursery is dedicated primarily to monitoring the infant’s vital signs in order to give anxious parents some peace of mind. In the process, infant data doubles are created and recreated, fed through smart algorithms and subsequently inform how parents parent.

In a phenomenology of parent-infant relations in the neonatal intensive care unit (NICU), Michael van Manen (2013) homes in on the neonatal monitor as, on the one hand, a noninvasive medical technology, and on the other, a medial environment that “places the parent in an interpretive relation to the child....Penetrating beyond the visible, the monitor discloses and reveals hidden, inner aspects of the child” (p. 45). Today’s AI-enhanced baby monitoring devices similarly transform the sleeping infant into a “smart” cyborg, a networked human-AI hybrid conscripted into an ongoing, interpassive and algorithmically conditioned communication world with their parents. The infant’s quick heartbeat, sweet warmth, quiet coos and urgent cries are heard by the parent not only as intuited sensibilities of care. The child also appears as streams of consumable data: digital readouts, daily charts and artificially intelligent interpreted calculations.

As the infant grows, AI-powered things and playthings may quickly find their way into young hands: from parents’ touch-sensitive mobile devices and voice-activated virtual home assistants like Alexa and Siri to smart robots and digital companions like Woobo, Roybi and Moxie. According to a recent study (Pew Research Center, 2020), half of the US parents surveyed reported that their 0 - 2-year-old children use or interact with a smartphone (49%), and a third with a tablet (35%). Overall, infants and toddlers spend about 50 minutes on a screen each day. Between ages 2 - 4, this figure jumps to 2 ½ hours, and for children ages 5 to 8, more than 3 hours/day. About half of the 2 - 4-year-old group have their own mobile device—for example a smartphone or tablet, and two-thirds of 5 - 8-year-olds have their own device. And despite a few spectacular failures (such as Mattel’s Hello Barbie and Cynthia Breazeal’s Jibo), a growing assortment of specialized smart toys, robots, and child-friendly tablet extensions is establishing a robust market among anxious parents by promising “creativity”, “interactivity”, “intelligence” and even “friendship” for their young children.

AI Policy and Children

In the midst of this domestic proliferation of smart devices, a multi-jurisdictional survey of existing laws regarding children and toys found that “no laws currently exist that directly regulate or mention AI” (Baker McKenzie, cited in World Economic Forum, 2019, p. 12). This situation may be quickly changing. Since 2019, several comprehensive ethics and policy documents regarding AI applications for children and in K-12 education (AIEdK-12) have been published to help guide AI regulation for children (Adams et al., 2021). In their review of five AIEdK-12 policy documents, Adams et al. noted that each statement promoted AI as a “right” and a “good” for children, upholding a vision of smart technology enhancing human capacity and empowerment. Numerous risks and tensions were also identified and in each case, guidelines or ethical principles are proposed to address these issues. Most concerns identified echo technoethical issues already raised regarding AI in broader society such as algorithmic bias automating discrimination and systemic racism,

AI-based profiling limiting opportunities and development; surveillance, data privacy and security violations; exacerbation of the digital divide. Further, when compared to other cross-sectoral AI ethics guidelines, the AIEK-12 documents shared multiple common ethical principles including Transparency, Justice and fairness, Non-maleficence, Responsibility, Privacy, Beneficence, Freedom and autonomy, and Trust (Jobin et al., 2019). In addition, Adams et al. (2021) identified four other principles: Pedagogical appropriateness, Children's rights, AI literacy and Teacher well-being.

Of the five documents reviewed by Adams et al. only two of these documents are inclusive of infants and preschool children: the World Economic Forum's (2019) *Generation AI: Establishing Global Standards for Children and AI* and UNICEF's (2021) *Policy Guidance on AI for Children 2.0*.¹ UNICEF (2021) also published a companion document, *Tools to operationalize the UNICEF policy guidance on AI for children*, with a "Development Canvas" (DC) to "support the design and development of AI applications for children" (p. 5). The DC, while intended for use by AI developers, provides a succinct summary of the larger ethical questions and concerns that parents and teachers today ought to be concerned with. The top three design requirements listed are:

- **Positive effects on children:** > What are positive effects for children? (e.g. education, health, entertainment) > Are you measuring and communicating positive impact? How?
- **Negative effects on children:** > Can children be negatively affected by this project? If yes, how? > How are limitations and risks dealt with and communicated?
- **Child development and well-being:** > Is the project specific to a particular age or development group? If not, can it be more tailored to the target group? > How does the project contribute to upholding children's rights and improving their well-being? > Does the project support the SDGs (Sustainable Development Goals)? Which ones? (p. 6)

Through these questions, the UNICEF DC also hints at the media ecological or "pharmacological" (Stiegler, 2010) nature of AI by attending to both the positive and negative effects of AI on children, as well as its broader focus on child development and well-being. In his *Phaedrus*, Plato describes the technology of writing as a *pharmakon*.

The Greek *pharmakon*—from which our words pharmacy, pharmacology and pharmaceuticals derive their origin—means recipe, cure, life-giving potion and sacrament, but ironically also drug, charm, perfume, and poison...Plato *reminds* us that every technology is always a flickering mirror play of both poison and cure, interior and exterior, recipe and spell, white magic and dark sorcery, life-giving potion and dangerous intoxicant. Every pharmacological prescription is remedial only in its carefully measured application. Too little and it doesn't work. Too much and it acts as a poison. Moreover, we are all ferocious users of this potent drug called technology. (Adams, 2017, p. 231, italics in original)

Nonetheless, as with many such AI ethical guideline documents, an instrumental, human-centric bias predominates. So while AI's pharmacological duplicities are made evident by examining its "positive" and "negative" effects, such guidelines fail to ask key posthumanist (sociomaterialist and postphenomenological) questions such as: "Who-what" may children be becoming in the midst of today's intensifying technosphere. Further, as a child's cognitive ecosystem is increasingly and habitually extended by and more tightly coupled with AI, a host of new ethical questions arise including: "atrophy and safety"; "moral status and personal identity"; "responsibility and trust"; "interference and control"; and "education and assessment" (Hernández-Orallo & Vold, 2019, pp. 511-512).

"What is in a child's hand" today?

At this juncture, we return to Kouppanou's question, "What is in a child's hand?" and more importantly for this paper, what is in a child's hand *today*? Deep into his little book, *Thumbelina: The Culture and Technology of Millennials*, Serres (2015) recounts the legend of the untimely death of Denis of Lutetia (now Paris) around 250 AD. Denis, a bishop, had been arrested and tortured by the Roman army under the decree of the emperor and was shortly condemned to death by beheading at the top of a large hill. As Serres tells it, the soldiers decided rather lazily not to climb to the hill's summit and instead executed the bishop halfway up. The bishop's head

¹ Adams et al. (2021) reviewed a 2020 version of the UNICEF (2021) policy guidance document.

rolled to the ground. Then to everyone's horror, a decapitated Denis picked up his head and continued to climb the slope. Terrified by this miracle, the soldiers ran off. Legend has it that on the way up, Denis took a break to wash his head then kept walking until he reached the present location in Paris (Montmartre in the 18th arrondissement). He was later canonized.

This miraculous cephalophoric event is beautifully captured in a mural by Léon Bonnat entitled, *The Martyrdom of St. Denis* (Figure 1.). Serres recounts this unusual tale to suggest that,

Not long ago, we all became like St. Denis. Our intelligent head has been externalized outside our skeletal and neuronal head. In our hands, the computer-box contains and manages what we used to call our “faculties”: a memory thousands of times more powerful than our own, an imagination stocked with millions of icons; and a faculty of reason as well, since software programs can solve hundreds of problems that we could never solve on our own. Our head has been projected before us in an objectified box. (p. 19)

For Serres, this disturbing image unexpectedly portends an extraordinarily hopeful future. Tomorrow's Thumbelinas and Tom Thumbs—as he calls children in honor of the dexterity of their thumbs in congress with their smartphones—are growing up with their heads fully severed and comfortably nestled in their hands. These young cephalophores or “head carriers” are a new incarnation of (post)humanity.



Figure 1: Léon Bonnat, *Le martyre de saint Denis*, 1874-88, Public domain, via Wikimedia Commons

Their shut-in skulls have been liberated of the burden of memory, of storing information, and of the procedural knowledge that children would normally be subjected to learn over many years of schooling. This radically exposed young human torso, with a smart device in hand, may now avail itself of a new intelligence under the purview of a spiritually open interiority. This miraculous human-nonhuman creation—made possible by the surgical blade of technology's double-edged sword—has unseated the crowning jewel of the humanist's Enlightenment: our autonomous, *cogito, ergo sum* intellect—and in its place, according to Serres, the “incandescent joy of invention” now rests on our children's shoulders. Tomorrow's cephalophore or head carrier “no longer has to work hard to gain [the] knowledge” once taught in schools since this knowledge is now always ready-to-hand: “collected, connected [and] accessible at her leisure” (p. 20). Instead, the Thumbelina child can focus her undivided attention “to the absence that hovers above her neck...a new genius” capable of truly inventive thought, possessing the cognitive agility to imagine a more democratic, more ethical, and more ecological future. Well, that is the future according to Serres.

Stiegler offers a much bleaker prognosis. While he does not reference Serres, we believe Stiegler would have surely agreed with him on this point: we humans—and our children—are indeed losing our heads to the digital. But instead of phoenixes rising to Serres' unique spiritual and cognitively transcendent occasion, for Stiegler, we beheaded cephalophores now find ourselves in a perpetual "state of shock". In this stunned and stuporous state, we are, he says, stupid, confused or simply numb. In his book, *States of Shock: Stupidity and Knowledge in the 21st Century*, Stiegler (2015) quotes Adorno and Horkheimer, who wrote in their *Dialectic of Enlightenment* that:

Stupidity is a scar... Every partial stupidity in a human being marks a spot where the awakening play of muscles has been inhibited instead of fostered. [...] [A]t the point where its impulse has been blocked, a scar can easily be left behind, a slight callous where the surface is numb. Such scars lead to deformations. (p. 213-214)

Since the arrival of digital technologies and its global networks, we have been increasingly outsourcing and offloading our memories, as well as other cognitive, social, cultural, and political work to electronic devices, and thereby creating a scar where our thinking heads used to be. In his *Understanding Media: The Extensions of Man*, Marshall McLuhan (1964) similarly describes the shock and numbness that transpires in the amputative wake of extending our body's perceptual reach. For McLuhan, electronic (digital) technologies "amputate" the nervous system including the human brain with its connective networks of synapses.

With the extensions of artificial intelligence, our critical, school-booked intelligence is being atrophied and deformed. We are more and more, according to Stiegler, living in a state of numbed stupidity. In the context of the digital, says Stiegler, "reason is ...autonomized--and as such becomes rationalization" (p. 136). On the one hand, AI, machine learning and the digital are profoundly extending our intelligent, cogitating selves. On the other hand, we are simultaneously losing our expertise, our savoir-faire is liquidated, each time we relinquish our hard-won practices of thinking and doing to the machine. Herein lies our stupor and stupidity and the double-edged sword of digital technology.

Unlike Serres, Stiegler does not foresee a spiritual awakening but a disturbing darkness where parents and educators must travail on behalf of children's future redemption from the artificially intelligent claws of big tech. Here, Stiegler (2010) presents a compelling picture of how the 'width' (and depth) of our critical-minded, modern attentional structure—the one that is normally developed in schools through learning how to read, write and do arithmetic—is being unpinned in our youth via psychotechnologies such as mobile devices and smart technologies (as opposed to psychotechniques such as reading a book) that act to foreshorten and erode the retentional and protentional bookends of attention—our memory and our imagination. Our educational institutions, that is, the systems traditionally "responsible for interiorizing the grounding retentional (memory) mechanisms connecting space and time", are being destabilized by our global complex of digital infrastructures. This disorientation involves gradually collapsing our 20th-century umbilical to local space and local time and resituating our attentional structure—consciousness—in a deeply programmed, synthetic substratum in the 21st century. In the programming industries attempts to restrain, secure and retrain our undivided attention...our consciousness is being splintered into micro-moments and territories, to be divvied up to the highest bidder.

Thus for Stiegler, putting artificial intelligence in the hands of the child is a deeply questionable affair. Smart software, especially, tailors and situates itself and speaks to the unguarded fleshy boundaries of our human thinking, doing and becoming. It is here that digital technologies touch us, intertwine their fingers in ours, and enfold us in their artificially intelligent embrace. It is here where we encounter inter-activity, but also inter-passivity, whereby we give over portions of our human agency—and responsibility—to the machine. For Stiegler, the eventual outcome of our submergence in this global digital *pharmakon*—designed by the programming industries to anticipate and thus control our micro-thoughts and movements—will result in the loss of individuation, and a silent "dissolve into a globalized, impersonal One" (Stiegler, 2011, p. 5) or quasi-inexistence.

Tomorrow's posthumans, networked learning and postdigital education

Returning to Serres' image of spiritual incandescence and tempered by Stiegler's understanding of the possible stupors of this heady artificial intoxication, it seems clear that parents and educators must exercise special care in choosing what cognitive "AI extenders" (Hernández-Orallo & Vold, 2019) they put in the hands of our young cephalophores. As Catherine Malabou (2019) suggests, "AI is no neutral technology; it is a transformational technology, challenging the architecture of traditional information systems and thereby bringing about a total upheaval of being-in-the-world" (p. 146). We have profound existential challenges before us. As pedagogues, we are ethically bound not to prescribe any and every new technology that arrives at our doorstep, but instead, to select and administer them judiciously and with care to the hands of our charges, with due regard for their pharmacological nature, that is their life-enhancing potentials but also their poisonous side effects. Indeed, as the media ecologists have been telling us for decades, we must wake up to the pharmacological nature of all technology and its reverberating environmental effects. Further, how can school jurisdictions, pre-service teacher education programs and curriculum developers adapt to better receive these young cephalophores?

One step towards this end would be for educational researchers and nonprofit organizations like Common Sense to commit to building an open access 'pharmacopeia' of digital technologies, that is, an ongoing account of AI's and the digital's manifold and interacting effects and side effects. Such a compendium, accessible online, would afford parents and pedagogues a way to critically assess AI's cognitive, perceptual, and social extensions and capacities alongside their possible destructive aspects in the context of the lifeworld of the developing child. How can this be accomplished? Like the recent demand for software companies to provide comprehensive and fair privacy and data sharing policies through enacting laws like the European Union's General Data Protection Regulation (GDPR), educational technology companies must also be required to declare all known or anticipated side effects and contraindications of their software, including possible adverse interactions with other software. To be approved for human use, pharmaceutical companies must provide a comprehensive assessment of the benefits and risks of a new drug along with strategies for managing known risks. It is now time that educational technology companies be held to a similar standard for their powerful software, designer algorithms that are specifically architected to "enhance", "adapt" and ultimately "transform" children's (developing) cognitive ecosystems. Current international policy documents on AI, ethics and children such as UNICEF's (2021) *Policy Guidance on AI for Children 2.0* and *Tools to operationalize the UNICEF policy guidance on AI for children* can serve as helpful guides in this direction.

Our phenomenological reflections on "what [technologies are] in a child's hand today" have led to a radical utopian/dystopian revisioning of tomorrow's posthuman: a cephalophore with heady new artificial intelligences at-hand, a "who-what" perpetually plugged into the global matrix. The present social media environment of "crazy talk, stupid talk" (Postman, 1976) and fake news may be a (hopefully) temporary symptom of our collective disorientation and stupor at having lost our heads. Our ability to reason, suddenly severed from our shoulders and outsourced, has been transformed into rationalization or stupid talk until we learn to live well and responsibly as human-AIs. It may take at least a generation or two to adapt to this new postdigital situation. Continued ontogenetic inquiries into the human-nonhuman entanglements and fluid prostheticities of our young may better position us to anticipate future configurations and ethical challenges of networked learning and postdigital education. Meanwhile, today's parents and educators must become media ecologists of the digital, able to discern and weigh the formative as well as the deformative dimensions of new media environments. Our homes and educational institutions ought not to become cathedrals of computation, but sustained cradles of care responsible for nurturing the development of our young cephalophores growing up in our posthuman era of Artificial Intelligence and Big Data.

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