TOWARDS NEW 'ONTOLOGIES OF THE BODY'. CHALLENGES AND OPPORTUNITIES ABOUT THE RELATIONSHIP BETWEEN EMBODIMENT AND DIGITALITY

VERSO NUOVE 'ONTOLOGIE DEL CORPO'. SFIDE ED OPPORTUNITÀ NELLA RELAZIONE TRA CORPOREITÀ E DIGITALITÀ

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Double Blind Peer Review

Citazione
Gemma, S., & Aruta, L. (2024). Towards new 'ontologies of the body'. Challenges and opportunities about the relationship between embodiment and digitality. *Giornale Italiano di Educazione alla Salute, Sport e Didattica Inclusiva*, 8(2), Edizioni Universitarie Romane.

Doi:
https://doi.org/10.32043/gsd.v8i3.1120

gsdjournal.it
ISSN: 2532-3296
ISBN 978-88-7730-494-0

ABSTRACT
'Embodiment' is a theoretical-interpretative construct that links various disciplines. In this sense, the body is both the 'locus' and the 'medium' of processes of exploration and identity construction, which are shaped by the constant cognitive-existential overexposure between the reality and the digital. Specifically, the following contribution offers a series of reflections in which the challenges and opportunities of the relationship between corporeality and digitality for educational purposes are embedded.

La 'corporeità' è un costrutto teorico-interpretativo che lega diverse discipline. Il corpo è, in questo senso, il 'locus' e il 'medium' dei processi di esplorazione e costruzione dell'identità che sono determinati dalla costante sovraesposizione cognitivo-esistenziale tra reale e digitale. Specificamente, il seguente contributo propone una serie di riflessioni nelle quali si annidano le sfide e le opportunità della relazione tra corporeità e digitalità a scopo educativo.

KEYWORDS
Embodiment; Educational sustainability; Media Education
Corporeità; Sostenibilità didattica; Educazione digitale

Received 30/04/2024
Accepted 14/06/2024
Published 24/06/2024

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1. Introduction: why new 'ontologies of the body'?

During the International Summit on the Teaching Profession[3] held in Spain in May 2022, representatives from various educational systems gathered to discuss how to support teachers in the pedagogical challenges of the 21st century. Key topics of interest included the digitalization of learning and inclusive education. Through the exchange of educational experiences among different countries and the analysis of data provided by OECD research (21st Century Children, Digital Education Outlook, PISA 2018, and TALIS 2018), the report "Building on COVID-19's Innovation Momentum for Digital, Inclusive Education"[4] was drafted.

In what is commonly referred to as the "third educational revolution", there is a renewal in teaching and learning methods, as well as in the ways of generating and transferring knowledge. With the advancement of the digital revolution, the traditional educational methodologies inherited are rapidly becoming outdated and obsolete (Pastena, 2020). Thus, in pedagogical and didactic terms, the speed of content changes must be matched by equally renewed learning processes, directly proportional to historical and cultural upheavals.

One of the suggestions that prompted this paper was the desire to search for a stable element to anchor oneself in the changing and emergent contexts described above. Once again, a discussion on the *body* and *corporeality* and their positioning between digitality and transmission in educational contexts appeared as a pivotal element to graft any further reflection on cognitive learning processes.

This paper will not revisit the main phenomenological theories on the role of the body and on bodily experience as an existential and pragmatic field of manifestation of the living, for which there is extensive literature[5], but it will outline the boundaries and areas of common interest in the constructs of *corporeality*, *identity*, and *digitality* and their existence either separately or simultaneously in pedagogical intervention. In this regard, Francesconi states:

> Bodily experience, as an existential and pragmatic field of manifestation of the living in which cognition is not merely executed but enacted, represents an extremely interesting field of study also for its concrete repercussions on

[3] https://istp2022.es/en/welcome/

[4] https://read.oecd-ilibrary.org/education/building-on-covid-19-s-innovation-momentum-for-digital-inclusive-education_24202496-en#page16

[5] Cfr. H. Maturana-F. Varela, Autopoiesis and Cognition*The Realization of the Living*. To trace the origins of embodied cognition, it is necessary to reference Martin Heidegger, Maurice Merleau-Ponty, and John Dewey.

> the educational level. Indeed, among the various themes available for addressing the marriage between pedagogy and neurocognitive sciences within the embodied perspective, that of corporeality and bodily cognition appears as a very promising area.[6]

Embodiment is the process that continuously generates the learning necessary for performance, where corporeality can be reinterpreted as an expansion of the physical body and the environment with which the agent interacts: it is the tactile and essential capacity to relate to the real world. This characteristic allows one to give meaning to the actions that the agent is capable of producing in the environment and to anchor their symbolic system to the characteristics it detects (Gomez Paloma, 2013).

Therefore, if the construction of personal identity, as well as cognitive, emotional, affective, and socio-relational development, are realized through a *body-in-action* (Caruana&Borghi, 2016) that is the meeting point of bio-psycho-cultural demands (Frauenfelder, 2001), the guidance in this process of personal discovery and interaction with the environment can only be of an educational type.

In this sense, in terms of stimulating meaningful cognitive processes, artificial and virtual tools and technologies should engage with corporeality and learning to foster innovative, motivating, and challenging relationships, rather than mere confounding blends of one into the other. It thus becomes crucial to undertake a meta-reflection on learning practices themselves, both by educational professionals and by the learners themselves. The transition from *Body* to *Corporeality* can only occur through educational and reflective insights, which are guarantors of humanizing processes, through which the body gains self-awareness, realizing its own sensing and acting fully.

After gathering these considerations, already extensively investigated in the field of *embodied cognition theory* (Wilson & Golonka, 2013), the question, from a pedagogical and educational perspective, is to identify which practices are most effective following a type of learning defined as *electric* and *electronic*, as e-learning, but also expanded and *extended*, thus *embodied*. The body has become 'electrified' from digital, a concrete medium of transmission and extension of the devices it utilizes. Thus, the difficulty of tracing limited boundaries corresponds to coordinates of space and time, key points on the teaching axis, equally confused and ambiguous; the media themselves have long "restructured our sensory life by changing our use of time and space; it is a hybrid, bionic condition" (Derrick de

[6] D. Francesconi, Pedagogia e neuroscienze cognitive in dialogo. L'esempio dell'esperienza corporea. *Formazione & insegnamento*, *9*(1), 2011, p.226.

Kerckhove, 2006). As Maria D'Ambrosio states about a learning that can be described as almost post-embodied:

> [...] e-learning thus is the result of a designation that takes into account the ever-present need to conjugate the learning process - understood as a complex performance through which each form of existence is generated and altered - with the many 'scenes' and different environments where it 'takes place' and 'becomes body': environments that qualify as autopoietic cognitive systems, generated by the connection between the spaces of the physical world, the mind, and the web, and open to becoming multi-agent environments.[7]

These transformations have led to a new type of emergency pedagogy, consequent to the impact that digitalization has had on the modification of educational systems and, in particular, the variations of learning *settings* and the bodies that learn and inhabit those interaction *spaces*.

The suggestion to propose a new 'ontological question' around the embodiment arises from the perception of an imbalance and a common sense of urgency dictated by an epistemological void towards a reality permeated by the oxymoronic presence of a bodiless intelligence (Di Tore, 2024), an entity without identity.

Since the early 2000s, the frenzy for the emergence of social networks had already imposed a new type of 'virtual corporeality' that trapped post-millennials in a 'hyper-socializing isolation' (Iavarone&Ferra 2017) made up of emotions hybridized in the liquidity of a digital reality. Recently, however, the easy availability of almost ready-made artificial intelligence systems has sparked renewed enthusiasm, involving interdisciplinary interests and concerns, particularly in the educational context. The new technologies indeed seem to have paved the way for a true incorporation of AI resulting in various forms of 'hybrid corporeality' that push towards a progressive erosion of boundaries. However, emerging from the machinic envelope that contains it, AI extends through the body, giving rise to an experience more ambiguously 'anthropic' (Stano, 2023).

In the present research, an attempt will be made to reflect on the possibility of a relationship between corporeality and digitality and on how to appropriately adjust educational support for learning processes and the construction of personal identity. The study of the integration between corporeality and educational use of technologies must necessarily question the values and meanings of embodied acts

[7] Carpenzano, O., D'Ambrosio, M., & Latour, L. (2016). *e-learning. electric extendend embodied*. Edizioni ETS, p.13.

and the neurodevelopmental processes underlying them (Frauenfelder, 2003). Indeed, the interdisciplinary and complex reality of AI can be the right tool to induce changes and innovations not only in educational methodologies but also in the way the ontology of knowledge is perceived and allowed to evolve (Ligorio, 2022). On closer inspection, therefore, AI itself suffers from an ontological deficiency: despite being conceived as software capable of processing information and making decisions, it still lacks a true physical manifestation in the world. And, precisely this perspective raises fundamental questions about the very nature of AI and its relationship with the human body. Initially, AI focused mainly on the rational and logical-cognitive aspects of human intelligence, but lately, these systems are increasingly leaning towards Emotional Artificial Intelligence (EAI), or *Affective Computing* which involves, once again, the incorporation of emotional skills into machines, combining affective computing with traditional artificial intelligence (Feola & Lo Presti, 2023).

Furthermore, a non-residual corporeality within the virtual life experience can propose movement as an effective device capable of creating opportunities for relationships by stimulating empathic processes, emotional management, and critical reflection: all areas of educational and training interest.

The digitalization of teaching has emphasized a series of entrenched challenges that concern not only the ability to interpret and guide the introduction of technological tools into educational processes rationally but also the possibility of restructuring the normative and organizational frameworks of educational institutions. Already in the era of Covid, it was necessary to reconfigure the conception of educational settings, both in terms of spaces and times: the 'educative space', which did not coincide in any way with a physical place, has been shaping as a novel and flexible dimension, a spatiality of 'shared solitudes', integrating the real and the virtual (Petrini, 2022).

More and more in the present time, we are entering a new scenario that presupposes a merging between human and digital life, no longer seen as confined environments, but rather as continuous and merged, in a dimension that is precisely *Onlife* (Floridi, 2015). In a multidisciplinary study on the impact of ICTs (information and communication technologies), *The Onlife Manifesto* explores how the development and widespread use of ICTs have a radical impact on the human condition. ICTs are not mere tools but rather social forces that are increasingly affecting our self-conception (who we are), our mutual interactions (how we socialize); our conception of reality (our metaphysics); and our interactions with reality (our agency). The hyperconnected and fluid reality in which we find

ourselves, within what is being attempted to define as 'new ontologies of the body', forces a reinterpretation of the very concept of embodiment to *dis-embodiment*:

> These are all different facets of a similar phenomenon that we could call *disembodiment* or *data-fication* of experiences. Algorithmic systems, acting as new epistemic membranes, seem to increase the opacity of many social phenomena. They are also changing the ways individuals are (automatically) identified, tracked, profiled, or evaluated, often in real time, adding opacity (invisibility) to traditional systems of identification, evaluation, and, thus, of "government." Automated, algorithmic systems are increasingly reading and editing behaviors, screening emotions, and calculating and measuring bodies, in order to profile users and to select the most appropriate information to display or decisions to propose.[8]

More specifically, then, to the great cultural-digital transition, educative thought can introduce its small daily revolutions by integrating into its methodological approach the exercise of an interrogative and complex thought. The previously stated thematic cores of body, identity, and digitality, which will be explored below, can only be investigated from an effective educational posture from an ecological perspective and a type of inquiry that, through the acceptance of complexity, seeks to "overcome confusion, complication, and the difficulty of thinking, with the help of an organizing thought: separating and relating"[9].

2. Embodiment and digitality: what relationship?

All disciplines involved in studies and research with and through the body investigate context, experience, and relationships transversally (Bonifacio & Aruta, 2022). In this sense, the body is the 'locus' and 'medium' for processes of exploration and identity construction that extend beyond the online/offline binary and are shaped by a constant cognitive-existential overexposure between the real and the digital. Corporeality and digitality construct a shared territory of knowledge and skills, which will always remain uncertain and incomplete without a multidisciplinary and systemic perspective that takes into account the complexity inherent in both analysis/evaluation and design/management of educational

[8] S. Broadbent & C. Lobet-Maris, Towards a grey ecology. *The onlife manifesto: Being human in a hyperconnected era*, 2015, pp.111-124.
[9] E. Morin, *Insegnare a vivere: manifesto per cambiare l'educazione*. Raffaello Cortina Editore, 2016, p. 79.

actions in motor educational contexts. This necessarily inhabits a space and time of epistemological reflection that values the educational opportunities inherent in human movement (Lipoma, 2014) and embraces the challenges posed by the use of digital technologies to support it. Thus, it is imperative to adopt a critical and reflective approach that aims for a theoretical-interpretative justification of the research models and educational actions intended to be practiced in a didactic-educational intervention that combines body and technologies. Indeed, the physical gesture can give meaning to the virtual experience, justifying the existence of digital spaces by virtue of a body that inhabits them. In this sense, the use of digital technologies can become a generative 'humus' of new possibilities for structuring educational interventions that foresee the fusion of body and technologies (Iavarone 2022; Aruta 2023) in a sustainable and evidence-based perspective.

Levels of physical-motor activity, especially in children and adolescents, have undergone a sharp reduction directly proportional to the massive increase in the use of digital technologies (Duan et al. 2020). The pandemic has further marked this abrupt decline in participation in movement activities (López-Bueno et al. 2020). Moreover, a comparison between pre-pandemic and post-pandemic periods in children and adolescents has reported an increase in anxiety and depression disorders (Ayubia & Komainib, 2021) amplified by poor sleep quality due to excessive use of digital devices before bedtime (Jniene et al. 2019; Limone & Toto, 2021). This literature highlights the need to understand the impact of technologies on the psychophysical well-being of individuals, considering their direct and indirect influence on individual self-construction.

In the relationship between corporeality and digitality, identity can thus be understood as a common object of investigation, unfolding within a complex and hybrid reality where the body must be protected as a manifest and medium of being in the world. Only within this orientation of thought can the awareness of a vertical relationship between body and technologies be expressed; a relationship to be understood not as a subordination of technologies to the body, but as a recognition of them as an ‘abstract body’ of knowledge and skills at the service of the physical body.

Corporeality, understood as the daily practice, the unique and indispensable device for constructing one's being-in-relation, can thus find in technologies the useful tool to articulate what is separate, connect what appears disjointed, and confront things. Every action is a psychophysical movement that expresses a position towards oneself, towards others, and with others. The body cannot, in fact, be thought of as an instrument that demarcates a boundary with the immaterial,

but it must be recognized that the body has always, even before the advent of technologies, been permeated by the material and immaterial realities of the environments in which it expresses itself (Orefice, 2012). Therefore, the relationship between corporeality and digitality should be explored while maintaining a focus on the complex reality of body education and how its thinking and feeling can foster a harmonious and concrete representation of reality.

In identity construction, the body plays a key role, expressing its intelligence, which is transversal and transferable (Gardner & Sosio, 2010) and manifests and advances particularly through contacts of uncertainty with the external and through the exercise and reiteration of errors (Le Boulch, 2003). Motor learning can indeed rely on learning-sequential structures whereby each new piece of knowledge acquired is the result of a negotiation with the preceding cognitive information and is preparatory to the next new form of knowledge (Mc Dougle & Taylor, 2019).

It follows, then, that the experimentation and attempts to use technologies in motor educational contexts can be interpreted as methods of advancing and integrating thought and knowledge (Annacontini, 2008). In this sense, the relationship between corporeality and digitality can support psychophysical learning processes by offering opportunities to enhance times of psychomotor exploration as potential spaces for education and development. If used to foster reflection and imagination, indeed, digital technologies can support the Central Nervous System in creating, updating, and activating cognitive representations crucial for the formation of an internal grammar of motor behaviors linked to neurodevelopmental processes (Mussa–Ivaldi & Bizzi, 2000).

3. New bodies, new learning?

Motor learning is an association of processes mediated by exercise and experience, capable of promoting change in performance or behavior (Schmidt & Lee, 2014). Essentially, these processes are an expression of a body that acts within an environment and with other bodies, structuring and deconstructing its neurobiological makeup by virtue of this interaction (Frauenfelder et al., 2018), crucial from birth for the identity development of the individual (Gallagher, 2005). The profound association between neurodevelopment and motor learning is articulated through four distinct processes (Willingham, 1999): a *strategic process* of relating to the environment; an *integrative process* of negotiating motor response; a *procedural process* of sequencing motor acts; and a *reflective process* of acquiring corrective information.

From a pedagogical perspective that seeks to engage with neuroscience, these processes should be interpreted as a simulacrum of reality useful for conceiving new actions guided by imaginative experience; thus, the application of digital technologies in motor-educational contexts can be a catalyst for experiences and a facilitator of such processes. The practice and transmission of experience are substantial elements for learning and training, and the errors inherent in these processes can provide a space/opportunity for building skills aimed at bridging any potential information gap between subject and environment. Therefore, the discourse on 'hard' and 'soft' skills can overflow into the awareness that on the body are inscribed the codes that link learning and the stimuli that determine it. The educational process, in this sense, is a new space-time that gives this instinctual relationship the opportunity to retain its most human and rational characteristics; and technologies can be the tool to renew these codes and enrich a set of subcodes capable of promoting intentional and determined training processes.

Considering that an educational objective expresses its credibility when it can rely on a learning tool capable of impacting development, this reflection directly underscores how the cognitive-existential setting represented by the body as a site of learning, changes with the changing relationship between bodily intelligences and the new 'bodyless intelligences'. The resonance with living environments, whether physical or digital, should be promoted and protected as an expressed corporeality that ensures the individual can filter and adapt energies, information, and stimuli within a historical-cultural context where the forms of thought and learning have profoundly changed (Iavarone, 2022). Hence, the promotion of *digital soft skills* (Iavarone & Aruta, 2022), understood as essential bridging competencies for inhabiting the relationship between corporeality and digitality with flexibility and creativity in both educational practices and actions.

4. Conclusions : educational sustainability about *empowered bodily practices*

The following contribution has attempted to briefly bring together a series of reflections within which lie the future challenges and opportunities of the relationship between corporeality and digitality for educational purposes.

The didactic sustainability of using technology in educational-motor contexts is closely related to the need to identify psycho-corporal practices functional to the promotion of empathic processes, emotional management, and critical reflection, and to understand to what extent digital contribution can ensure empowerment of such functionality. Digital practices used in educational-training contexts can thus

be reinterpreted as *empowered bodily practices*, actions in which the electrified body promotes experiences of techno-anthropological nature capable of meeting different but convergent disciplinary fields on the totality of the human cognitive system. In empowered bodily practices, two aspects are promoted: *imagination*, as a space for cognitive representation of things, and *reflection*, as a time for reconstruction and reorganization of such representations useful for interpreting things as a whole. Reflectivity and the practice of imagination, therefore, can be understood as education for plural and multidimensional, ecological, and complex thinking. These processes catalyze an intra-corporeal and inter-corporeal dialogue indispensable in the construction and negotiations of logical structures of thought.

In this sense, 'embodied-centered-tech' educational experiences represent an opportunity to reconnect with one's human identity, promoting the development of a psycho-corporal intelligence capable of embodying even an intelligence without a body, such as technology. If, on the one hand, technologies manage to positively render fluid and participatory transdisciplinary approaches, rather than reductionist and transitory logics (Pastena, 2022), all this without adequate educational mediators risks dispersing and segmenting it, reducing the formative process to mere algorithmic calculation. In this regard, it will not be the mere presence of technologies that guarantees the identity of a subject. What will truly Augment reality will be precisely the integration with the uniqueness represented by the Body, whose bio-psychocultural mechanisms are already builders and amplifiers of reality.

Paradoxically, then, didactic sustainability in the use of digital technologies in educational-motor contexts is closely tied to body education itself. Specifically, it is necessary to experiment with didactic possibilities that not only include among the outcomes the impact assessment of technologies for educational use but also urge that all this be inserted into an adequate didactic design preliminarily conceived in an embodied-centered-tech perspective. In this perspective, the school should also be rethought as a laboratory for experimenting with the complex relationship between corporeality and digitality, promoting and proposing educational experiences that in the dichotomy between real/imaginary find two axes of thought/action to be configured and reconfigured in interconnected and hybrid environments beyond the boundaries between formal, informal, and non-formal education.

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