REFLEXIVITY: LIGHTS AND SHADOWS OF THE RELATIONSHIP BETWEEN TECHNOLOGY AND EDUCATION

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In the work How We Think (1910), Dewey places reflective thinking at the centre of his discussion, which is considered "the best way of thinking" and implemented when we faced with a problematic situation with no certain solution. As a result, the need arises to create new patterns of action, modifying or replacing previous ones. Reflective thinking enables the individual to question the logic behind the interpretation of everyday life experiences, that is, all those actions that are habitually performed following the interpretive canons given by past experiences. Therefore, enhancing the generative drive of thought through the development of critical and reflective thinking is one of the challenges of complexity culture. But how are the characters of reflexivity, freedom and self-awareness (Cambi, Pinto Minerva, 2023) combined with the assumptions of the onlife Era (Floridi, 2015), a new existence within which the real and virtual merge (and blur) and where the speed and instantaneousness of social networks do encourage instantaneous and unthoughtful reactions? Tech-age education calls for a post-human broadening of the field of experience. The very technology that has changed times, liquefying them, and dilated places, even defining them as non-places, can represent a crossroads of new reflexive intentionalities, and the peculiar con- junction of reflexivity and new technologies seems to be an opportunity for authentic educational design. There is a need, therefore, to find that Pirandellian lantern which allows one to illuminate experience and to sift through the fallout it has in the re elaboration of consciousness, as guarantee of the "proper distance", wished by Silverstone (2007), which requires the world of education, to reconfigure itself as a promis of generativity, of identity construction and social inclusion also in the era of technics and technology (Bonaiuti et al., 2017). The encroachment thus initiated, mediated by the virtues of the digital (Rivoltella, 2015), builds bridges between the analog and the virtual, the old and the new, the human and the post-human, preserving the all-too-human and ethically set creative act of all cultural artifacts.

reflexivity, education, IA, generative pedagogy, technology

INTRODUCTION

In his work *How We Think* (1910), John Dewey places reflective thought at the center of his discussion, considering it "the best way of thinking" and defining it as a process activated when one faces a problematic situation with no clear solution. This triggers the need to create new action models, modifying or replacing the existing ones. Reflective thought enables individuals to question the logic behind their interpretations of everyday life experiences those actions habitually performed based on interpretive frameworks derived from past experiences. For Dewey, reflective action occurs in problematic situations without a certain solution, prompting the creation of new action models. He describes the function of reflective thought as "to transform a situation in which one has experienced darkness, doubt, conflict, or some disturbance, into a clear, coherent, resolved, harmonious situation" (Dewey, 1910, p. 172).

Dewey contrasts reflective thought with other types of mental processes commonly referred to as "thinking." The first type is the so-called "stream of consciousness," characterized as an "uncontrolled course of ideas," "automatic and ruleless," a "disorderly meandering of mental images, random reminiscences, pleasant but unfounded hopes, rapid and sketchy impressions" (Dewey, 1910). It consists of a more or less extended sequence of ideas without a particular order, where the ideas are connected but lack a unifying principle to guide the sequence. In contrast, reflective thought is not a chaotic sequence of ideas but a "sequence" of ideas: "an ordered series or chain," a consecutive order where each idea determines the next as its result, and each result relies on or refers to what precedes it.

The second meaning of thought is limited to "things not directly perceived or felt, things not seen, heard, touched, smelled, or tasted" a purely imaginary construction produced by imagination. In this sense, "a thought or idea is a mental representation of something not currently present, and thinking is the succession of such representations" (Dewey, 1910). Reflective thought, however, aims at a conclusion: the chain of thoughts must lead toward a specific endpoint or conclusion established beyond the mere flow of images.

The third definition of thought aligns with belief, encompassing matters about

which we lack certain knowledge but are sufficiently confident to act upon, as well as matters we currently accept as true or as knowledge but might question in the future. Thinking as synonymous with believing is a decidedly passive operation: it entails adopting ideas from others and accepting them because they are commonly held, not because the individual has examined the issue or actively contributed to forming that belief. Such ideas, often termed prejudices (premature judgments not derived from observation or data analysis), infiltrate the mind and become part of our mental framework without our conscious awareness. Reflective thought, in contrast, involves an active process: "it requires examination, careful inquiry, and personal investigation" and consists of an "active, persistent, and diligent consideration of a belief or hypothetical form of knowledge in light of the evidence that supports it and the further conclusions to which it leads."

1. REFLEXIVITY AS A POSSIBILITY

How, then, do the characteristics of reflexivity, freedom, and self-awareness (Cambi, Pinto Minerva, 2023) align with the premises of the "onlife era" (Floridi, 2015) a new existence where the real and virtual merge (and blur) and where the speed and immediacy of social networks encourage unconsidered, instantaneous reactions? Applying Dewey's mental processes to the digital realm reveals intriguing parallels with the behavior of the "technological" user.

The stream of consciousness, for example, can be associated with the torrent of "stories" we share daily on social media—disconnected, illogical glimpses of public and private moments.

> Stories, posts, and videos published on social platforms for only a few hours, before disappearing, seem to fulfill other needs and intentions among young people, linked to projecting an image of themselves that is beautiful, happy, or provisional, partial, enigmatic, and challenging to decode without the necessary contextual codes (Lancini, Cirillo, 2022).

Additionally, the rapidity and transience of information encourage decreased focus and the development of fragmented knowledge, as digital culture often prioritizes granularity and fragmentation over length and complexity. Practices like "cut and paste" flatten content into an eternal present (Rivoltella, 2015), reducing knowledge to disjointed, copied, and repurposed fragments.

Imagination, on the other hand, can be situated at the heart of the eternal tension between being and appearing. Concepts like the "society of the image,"

social self-display, and prioritizing appearance over being are increasingly pervasive in digital culture, where young people construct their identities and fulfill their desire for "extimacy" (Tisseron, 2013), driven by a relentless quest for validation and appreciation (Rivoltella, 2015). The imperative is to live under the spotlight, favoring the public sphere over the private, in a never-ending pursuit of followers and likes a phenomenon aligned with the so-called "like addiction" or "digital narcissism."

Finally, belief can be likened to the frequent habit of being guided by common sense rather than evidence, sharing and posting fake news without verifying their credibility.

> Media transformations, evolving communication models, and the intense and continuous use of electronic technologies (...) lead us to believe that knowledge must adapt to the medium, rather than us, as reflective and critical individuals, deciding how to use a particular tool and how it should function (Bocciolesi, 2014).

This is why fostering the generative force of thought through the development of critical and reflective thinking represents one of the challenges of a culture of complexity. In the face of the contemporary world's fluidity and complexity (Bauman, 2008), the plurality of educational agents, the pervasive use of new technologies, and constant access to information and online interconnections, it is essential to autonomously find ways to access and connect knowledge, maintain a level of critical reflection that enables the development of one's own perspective, remain flexible to shift viewpoints, and tolerate doubt and uncertainty. Rather than passively absorbing others' thoughts, we must strive to influence the world actively.

2. STONES THROWN AND ARTIFACTS

A reflection on the age of technology and its governance (Cambi, Pinto Minerva, 2023) must necessarily delve into the relationship between the subject conceived as a thinking human being or, in the case of educators, as reflective practitioners (Schön, 1983) and their artifacts, including digital products and methodologies. Such an inquiry essentially revisits the nature-culture debate, almost resolving it into the new alliance foreshadowed by Prigogine and Stengers (1981), between human history, knowledge, and societies, and nature's own exploratory journey. Neuroscience (Rizzolatti, Sinigaglia, 2006; Gallese, 2007) has in recent years advocated overcoming the dualism between realism and constructivism (Rivoltella, Rossi, 2019), as well as the polarity

between nature and culture. Digital technology appears to silence the age-old opposition between knowledge and action, between perception and action (Berthoz, 2009), inaugurating a new infospheric era (Floridi, 2015), perhaps ungovernable, where humans and machines, natural subjects, and cultural objects, merge to create a world in which humans and artifacts are nearly indistinguishable.

To understand how artifacts and subjects can effectively interpenetrate, it is necessary to consider the possibility that artifacts might escape human control, deviating from the ontological-technological-political process of "hominization" (Sloterdijk, 2004). In human evolution, the stone symbolizes a positive relationship and reaction to the environment, allowing humans to transcend the constraints of flight through reflection and the development of mediated solutions. By contemplating the stone and its uses, humanity transforms it into a tool of power. This reflective process leads humans to continually choose between possible actions within their environment. Sloterdijk investigates the human-stone relationship, showing how gestures like striking and cutting prelinguistic and mediatory acts revolve around the physical proximity and manipulability of the stone, an object both from and within the world. However, when the stone is thrown when humans make a technical formalization choice (Sloterdijk, 2004) it becomes an artifact. The stone shifts from being merely an object within the world to an object for the world, creating new spaces and expanding human experience.

If the image of the stone evolving into an artifact, capable of expanding human experience, can serve to illustrate how digital technology blurs the distinction between artifacts and subjects, further reflection is needed on the human activities involved in creating artifacts and the contributions these artifacts can make beyond their practical utility. Norman (1993) reflects on the difference between the stone as a cutting tool and the stone as a projectile between the pragmatic, experiential aspect of the stone-object and the reflective use of the stone-artifact. Similarly, Rabardel (1995) clarifies the distinction between the stone as an object and as an artifact, critiquing technocentrism. Technologies, from stones to learning machines, have always been defined by their function and purpose without adequate consideration of their relationship to context and environment. Rabardel argues that artifacts possess dual natures: they are simultaneously outil (physical structures) and instrument (relational entities linked to human action, usage patterns, and emerging knowledge). An artifact thus becomes an instrumental entity shaped by and shaping its user (Rivoltella, Rossi, 2019). Vygotsky (1934) similarly recognizes tools' dual potential to

regulate human conduct and transform the environment, as well as to guide one's behavior and that of others.

3. LANTERNS AND PROPER DISTANCES IN THE ERA OF THE INTERNET OF THINGS

The advent of artificial intelligence (AI) has dissolved the marked distinction between subjects, objects, tools, and the environment. AI has disrupted traditional conceptions of technological tools (Panciroli, Rivoltella, 2023): gone are the days of mass media representing mass communication, creating new public spaces (like television and later social networks) analogous to the stone's transformative role for early hominids. Technological objects are no longer central; the era of the materiality of objects be it stone or television is over. The Internet of Things (Za, 2021) has reinvigorated objects, embedding them with connectivity and transforming them into smart entities. For instance, the Internet of Toys (Mascheroni, Holloway, 2019) has redefined childhood toys and caregiving tools, while social robotics has forever changed everyday objects like watches (now smart) and homes (now automated). In this post-media world, human-artifact relations are mediated by AI, which, like the thrown stone, demands ethical decision-making. AI introduces an unprecedented form of world governance that often leaves humanity disoriented. Floridi (2014) describes this as the "information revolution." Platformization and mandatory datafication transform human capital into algorithmic capital (Marangi, 2023), creating a cultural hegemony akin to a new religion (Balbi, 2022; Van Dijk, 2014).

Amid the light and shadows of digital innovation, we must rediscover the "proper distance" (Silverstone, 2007). Like modern Mattia Pascals (Pirandello, 2023), we must question whether humans still retain their place in the human-artifact-environment relationship or whether artifacts have wholly consumed their creators. Using the reflective lantern metaphor, we must structure new relational possibilities with the environment, the world, and others, reaffirming humanity's ability to control its creations as a vital, creative act.

4. FOR AN ETHICAL FUTURE OF EDUCATION

Education represents this lantern's beam; it is the luminous projection that illuminates human experience, revealing reality as something to engage with and understand. Cambi and Pinto Minerva (2023) restore to education the role of recovering the lantern's angle of projection. The digital jungle must be reimagined as the wild environment where early humans began shaping their world with stones, now embodied by AI.

The Beijing Consensus (2019), a key international document on AI and education, invites reflection on ethics, safety, and responsibility, advocating for an AI guided by ethical principles and respect for humanity. As an artifact, AI must be designed to avoid consuming its creator, echoing the dystopian visions of body horror in art and cinema. Reflective thinking is thus crucial for promoting knowledge and awareness of tool usage, identifying biases, evaluating risks, and adopting a multisystemic vision rooted in Von Bertalanffy's ideas (2004).

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