



*Heirs to the future. Towards a new pedagogical culture  
of human development and sustainability*  
*Eredi di futuro. Per una nuova cultura pedagogica  
dello sviluppo umano e della sostenibilità*

---

Giambattista Bufalino

University of Catania – gbufalino@unict.it

Gabriella D'Aprile

University of Catania – gabriella.daprile@unict.it

---

**ABSTRACT**

The COVID-19 health emergency and the planetary crisis, which are inextricably linked to the ongoing climate and environmental impacts, have forced us to confront unprecedented contingencies, serving as a reflective stimulus to address some of the most urgent educational issues. Sustainability should be understood as the transformative possibility of “changing the way”, that is, the educational paradigm, which can only be mobilized by pedagogically qualified lifestyles oriented toward integral, environmental, and human ecology. Accepting this conscious and non-rhetorical invitation directly requires pedagogical responsibility in initiating processes of profound reflection for a new culture of human development that reclaims the ontological values of limitation and care as indicators of human and social resilience.

L'emergenza sanitaria da COVID-19 e la crisi planetaria strettamente connessa agli impatti climatici e ambientali in atto provocati dall'uomo determinano contingenze senza precedenti che, nonostante la loro problematicità, possono divenire stimolo riflessivo per ripensare alcune questioni fondanti dell'educazione. La sostenibilità va colta come la possibilità trasformativa di “cambiare strada”, cioè paradigma educativo, che può essere mobilitato solo qualificando pedagogicamente gli stili di vita nella prospettiva di una ecologia integrale, ambientale e umana. Questo invito sfidante e ineludibile chiama direttamente in causa la responsabilità pedagogica nell'accogliere l'appello consapevole e non retorico per una nuova cultura dello sviluppo umano che recuperi i valori ontologici del limite e della cura come indicatori di resilienza umana e sociale.

**KEYWORDS**

Anthropocene - Sustainability- Education - Human Development- Stiegler Bernard.

Antropocene - Sostenibilità- Educazione - Sviluppo Umano- Stiegler Bernard.

\* The authors developed the idea and project of this paper together. In detail, paragraph 1 and 2 were written by Giambattista Bufalino, paragraphs 3 and 4 were written by Gabriella D'Aprile, and paragraph 5 was written by both authors.

## 1. The “Anthropocene”: an open question

The recent tragic experience of Covid-19 has highlighted the contradictions and real paradoxes of human action, as well as the need for a shift in the economic paradigm and a significant reform of how we live on Earth. COVID-19 has exploited the vulnerabilities created by human beings. Indeed, over the centuries, human action has become increasingly incisive, gradually transforming the planet, triggering processes that could prove irreversible, and projecting it into a new geological era: the Anthropocene.

In its current form, the term Anthropocene refers to a concept developed by atmospheric chemist Paul Crutzen and biologist Eugene Stoermer (2000). In a note published in 2000 by the International Geosphere-Biosphere Program (IGBP), the two scientists claimed that the impact of human activities on the earth and the environment is such that the central role of humans in geology and ecology must be recognized. It is possible to argue that the transition from the Holocene to the Anthropocene – the age of *anthropos* (the human being) – has now taken place (e.g., Steffen et al. 2011). While there is no universal agreement on the definition of the term, Anthropocene is now used in a wide range of disciplines. There is no single Anthropocene, but rather many Anthropocenes that overlap and juxtapose different research analyzes (Lewis, Maslin, 2015; Chernilo, 2017). A large number of scientific publications (Brondizio et al. 2016) as well as the publication of two multidisciplinary journals, *Anthropocene*, which has been published since 2013, and *The Anthropocene Review*, which began in 2014, attest to the rapid development of studies that have adopted this theoretical perspective.

The thesis advocating the need to recognize the existence of a new era is based on an assessment of the serious consequences of human presence on the entire Earth system. In fact, there are no places on the planet that have not been touched by human intervention (Descola, 2014).

Ensuring growth has long been understood as the purpose of development, based on the premise that economic growth generates positive effects that eventually guarantee greater well-being for all (Unesco, 2015, p. 21).

However, unsustainable patterns of production and consumption point to fundamental contradictions in a dominant pattern of development focused on economic growth. As a result of unhindered growth and over-exploitation of natural areas, climate change is causing an increase in natural disasters, putting developing countries in particular danger. This, paradoxically, increases prosperity while also increasing vulnerability and injustice. Indeed, in today's interconnected and interdependent world, changes introduce new levels of uncertainty, tensions, and paradoxes, as well as new knowledge horizons that must be addressed.

In a broader sense, the questions concern a number of issues on which Western thought is based, despite Nietzsche's “telluric shocks”: first, the opposition between nature and culture and, subsequently, anthropocentrism, ethnocentrism, prometheanism, enlightenment rationality, the concepts of *telos* and universal history. Finally, the Anthropocene appears to be urging the possibility/necessity of thinking about the future as such (Baranzoni, Lucci & Vignola, 2016).

Because the Anthropocene actually points to the fallacy of anthropocentrism, it has a contradictory meaning. At the very moment when human beings are given a directing role over the Earth, it is always noted that human existence is primarily dependent on non-human factors, such as weather, technology, other living beings and the very material and geological strata. Moreover, what kind of humanity

does *anthropos* refer to, one that is responsible not for its own ends, but for its own end? If the causes of the impending disaster are found in a specific set of human activities, it is clear that one cannot point to the abstract idea of humanity behind the *anthropos*, which is responsible for poisoning the earth. Obviously, we face a new conception of ourselves by recognizing that we are both a “agent of destruction and [an] endangered species” (Colebrook, 2016, p. 89). We may well face the disintegration of societies as we know them, as well as the collapse of a barbarous resource competition. In this sense, focusing on the effects of human action on the environment, understood in geological terms, can reinforce the form of human self-exaltation hidden behind the meaning of natural action. We are culturally embedded in a reality in which everything we encounter (including the natural world) is evaluated based on its ability to serve or not serve our will, according to the economic logic of consumption.

There are several critical aspects of the concept of Anthropocene. For example, Descola (2014) identifies two of them: the first problematic aspect is the very idea of humanity behind this concept, which, from the perspective of the natural sciences, recognizes its substantial uniformity and it is generally conceived in terms of species. The second aspect relates to the scale of the analysis, which favors the global dimension while ignoring the local and territorial dimensions. As a result, the attribution of responsibility for the harmful impact that human activities on the planet and on the environment is a matter for humanity, which is conceived as unique and undifferentiated (Branca, Fabiano, & Pau, 2020). Furthermore, given the clear intertwining of the social and material aspects of life on Earth, conventional narratives about the Anthropocene prefer to focus on *environmental* change rather than *social* change. This shifts scholarly focus away from the *Anthropocene* as a deeply cultural phenomenon (Rickards, 2015) and from the social and cultural norms, practices and power relations that lead to environmental problems in the first place.

Several authors have insisted on the impossibility of making humanity as a whole responsible for the current ecological and environmental crisis. It is therefore appropriate to consider the Anthropocene as a geo-politically centered concept in the Euro-North Atlantic region (Ulloa, 2017) linked to the predominant Western worldview (Haraway, 2015). This perspective advocates for a more thorough examination of socio political and economic inequalities stemming, for example, from colonial history intertwined with the dynamics of environmental exploitation. Another problematic aspect implicit in the concept of the Anthropocene is the idea of a global view at the expense of local relations, not taking into account specific dynamics, given that the emphasis is on humanity as a species and the planet as a whole. Several scholars have proposed alternatives in response to the simplified use of the term Anthropocene for global climate change. For example, *Capitalocene* was proposed by Andreas Malm (2014) and developed by Jason Moore (2017) a concept that emphasizes the power hierarchies of social and environmental production processes that began with European colonial expansion and initiated the capitalist system.

## 2. Entropy and negentropy. Pedagogical implications

The philosopher Bernard Stiegler (1952-2020) has elaborated one of the most lucid and contemporary diagnoses of Anthropocene. In Stiegler's view, the notion of *Anthropocene* referred first and foremost to the massive toxicity of the contem-

porary global organological configuration<sup>1</sup> resulting from the process of industrialization initiated by the Industrial Revolution, which Stiegler sees as an organic revolution. This organic toxicity is the root cause of pollution and degradation of the natural ecological systems that comprise the Earth's biosphere (Stiegler, 2016).

Stiegler critically examines the temporal structures and dynamics that underlie the current situation in order to emerge as soon as possible from the Anthropocene disaster, a condition that is plunging the world into destruction (Featherstone, 2020).

At a time when computing and automation literally shape every aspect of human life, the Anthropocene manifests itself in the disquiet of man and the future of human life on Earth. From the steam engine and thermodynamics laws to the Big Data and correlation mathematics, Stiegler identifies the thread of *mathesis universalis* that, under the impulse of technical acceleration, leads to the integral automation of society on an algorithmic basis, that is the manifestation of nihilism in the technological mode. This automation would not be entirely negative in itself. However, it is becoming extremely toxic as a result of political neglect, which allows the current economic system to exploit automation without restriction and allows consumerism associated with technological acceleration to develop without any regulation or planning. The consequence is the development of an entropic process of psychological and environmental destruction. The so-called *Big data* is an example of this massive transformation that is leading globalized consumerism to liquidate all forms of knowledge (*savoir vivre, savoir faire* and *savoir conceptualiser*, Stiegler, 2015).

Stiegler applies the concepts of entropy and negentropy from thermodynamic laws to a social reality. The uniqueness of Stiegler's analysis is that it goes beyond the strict physical meaning of the entropy-negentropy relationship. This relationship is transferred to an anthropological and political discourse that focuses on the relationship between the speed of technological evolution and human capacity to cope with it.

The human activities of Anthropocene lead to the development of *exosomatization* (the continuous evolution of life by artificial organs rather than just somatic ones, i.e., the impulse of digital technologies) and the increase of *entropy* (which defines on the one hand a state of increasing disorder and on the other a degradation of energy linked to an increase in this entropy). The increasing automation of our daily lives is linked to exosomatization.

At this point, Stiegler introduces the concept of negative entropy, or *negentropy*, which is the countertendency that, when confronted with an increase in system disorder, reintroduces order. Thus, the French philosopher imagines the possibility of opening a bifurcation to the destiny of mankind through the redirection of the entropy caused by the Anthropocene. Such a relationship defines the human being's negentropic abilities and, in a broader sense, societal knowledge.

Any knowledge - understood as knowing how to do, i.e., how to ensure that what I do does not collapse and lead to chaos; as knowing how to live, i.e.,

1 The term comes from the Greek word *organon*, which means "tool" or "instrument". General organology is a method of examining the past and future of physiological organs, artificial organs, and social organizations all at once. It describes the interactive and seducing relationship that exists between three types of "organs": physiological, technical, and social. The relationship is transductive in the sense that changing a term in one organ always changes the terms in the other two types of organs (Stiegler, 2013).

how to enrich and identify the social organisation in which I live without destroying it; as conceptual knowledge, i.e., how to inherit from one's past by systematically questioning it' (Stiegler, 2015)

Stiegler refers to the Anthropocene as an *Entropocene* because it has resulted in the toxicity and degradation of our global ecology. Overcoming it clearly calls for a negentropic shift in the very organological state of the *anthropos*. This negentropic turn should be understood as a neganthropic turn, ushering in the *Neganthropocene* (Stiegler, 2018). The *Neganthropocene* requires a new conception of the human being, which Stiegler refers to as the *neganthropos*, imagined as a result of a new organological configuration, constituting a new global society and political economy in which all human activity takes place. In this sense, Stiegler refutes the dystopian vision of the anthropocene, which has become completely unsustainable, and introduces the utopian possibility of the *Neganthropocene*, where humans would live in harmony with the natural world. Combating the numerous, chronic toxicities associated with the *Neganthropocene* and ensuring a living future necessitates addressing all of these interconnected ecologies: the methodology, the theory, and the practice of healing. In other words, pharmacology is an evaluation of what is beneficial or harmful, life-expanding or limiting; entropic or negentropic (Stiegler, Vignola, Baranzoni, 2015).

The fundamental role of education is becoming clear. On the one hand, Stiegler sees the anthropocene as an apocalyptic boundary that threatens the end of the world; on the other hand, he proposes a new path based on the need to recognize the planet's finiteness. There will be no one-size-fits-all solutions; instead, social and individual responsibility will be required. On the one side, we must legitimize and improve the relationship between science and technology; on the other side, we must focus on education and on the importance of educational processes that allow students to track the emergence of the Anthropocene and their own and other people's moral responses on the basis of an understanding of the world. This could be an important response to the apparent incompatibility between the scale and complexity of the global crisis and the scale and effectiveness of local, ethically driven action.

### 3. A Pedagogical culture of human development and sustainability

In the context of a planet seriously affected by environmental and social degradation, numerous ecological disasters and recent pandemic upheavals, what theoretical and operational tools, models and practices can contemporary pedagogical research adopt?

Despite technological progress, supposed emergency preparedness and repeated warnings, the pandemic exposed our planet's fragile socioeconomic and environmental foundations, which were not ready when the virus struck.

The current crisis appears to have fueled debate about the inextricable link between human ecology and environmental ecology, economic ecology and socio-cultural ecology. Everything is interconnected and contained within the links to which we belong. In particular, current events are causing a real paradigm shift that can only be mobilized by pedagogically qualified lifestyles aimed at the common good. The pedagogical relevance of the cultural paradigm of integral ecology to the educational perspectives of "caring for the common home" is crucial to addressing the crises that we are experiencing in a generative manner.

Furthermore, the ecological tension, in terms of caring for and paying attention

to the planet, has acquired considerable importance in recent decades, both on the level of sensitivity of individuals and on the level of general scientific, political and cultural trends. Environmental issues were also given more attention in pedagogical reflection (Mortari, 1998; 2001; Malavasi, 2014). With the introduction of education for sustainability, environmental issues have only recently become relevant to educational theory, based on the broad cultural debate on the subject (Malavasi, Iavarone, Mortari, 2018).

Environmental issues are explored in educational research through theoretical and conceptual frameworks that span the local and global, current and future generations, ethical issues, and individual and collective responsibility. In comparison to the past, the very concept of environmental education is changing: subjects and contexts are changing, including not only formal contexts, such as schools, but also informal and non-formal ones, with a view to broader learning processes involving the construction of knowledge, in accordance with the logic of lifelong learning. Moreover, the objectives of the 2030 Agenda call for a clear political and pedagogical commitment: to re-launch the sustainability issue at the heart of the daily life of education and training services. The concept of sustainability is interpreted in the social, economic and cultural aspects of the document, but it is, above all, educational:

Ensure by 2030 that all learners acquire the knowledge and skills necessary to promote sustainable development, through education aimed at sustainable development and lifestyles, human rights, gender equality, the promotion of a peaceful and non-violent culture, global citizenship, the appreciation of cultural diversity and the contribution of culture to sustainable development (UN General Assembly, 2015).

As stated in recent policy statements and the declaration of Goal 4, adopted by the United Nations in 2015, the critical role of education for sustainable development and lifestyles is now widely recognized in the identification, implementation, and monitoring of plans, strategies, and actions aimed at encouraging positive change toward a more equitable, inclusive, and inclusive world. But what exactly is sustainable development, and how does it impact educational processes?

According to Serge Latouche, sustainable development appears to be an oxymoron. Calling for development to be “sustainable” is impossible, according to the French economist, sociologist, and philosopher, because it contradicts its very nature. “Degrowth” is the only way to achieve long-term development (Latouche, 2007; 2017), reducing all forms of natural and environmental resource exploitation and “decolonizing” the collective imagination, which feeds increasingly unbridled and alienating consumption.

It might be worthwhile to begin with Latouche’s strident provocation and his critical and radical demands. The concept of sustainable development appears to be simple and intuitive because it has become important from a scientific, cultural and theoretical perspective. The difficulty in defining sustainable development is most likely due to the strong anti-nominal tensions of the term, which, on the one hand, postulates a constant need for the evolution of society towards greater well-being; on the other, proposes a limitation of living conditions in the organizational structures of societies and economies (Sachs, 1998; 2015).

Sustainable development is never a “given” element that is acquired once and for all, but rather a changing condition that “constructs” ever-new meanings depending on the point of view of the subject (Von Foerster, 1984; Bocchi, Ceruti,

2007; Ceruti, 1989). Possible limits and conditions of development cannot be objectively and universally classified because they vary according to historical contexts, economic conditions, and social contexts (Huckle, Sterling, 1996), as well as the multiple dimensions of the founding pillars, Environment, Economy, and Society.

In recent years, the concept of sustainable development has sparked interest and awareness of the theoretical implications of the *Pedagogy of the Environment*. Important educational applications of the concept have been made, such as the introduction of environmental and sustainable development education (*Educazione ambientale e allo sviluppo sostenibile*) in Italy (MIUR, 2009). Furthermore, in July 2017, the Italian Ministry of Education, Universities, and Research released a Plan for Education for Sustainability (*Piano di Educazione alla Sostenibilità*), which emphasizes the need to intervene at the level of integrated policies for the development of people's quality of life, rather than creating hierarchies or divisions between the various dimensions of the economy, the environment, and society.

The decisive step in the context of pedagogical sciences is to define sophisticated interpretative theoretical tools to begin a careful critical examination of "pedagogical hermeneutics" (Malavasi 2007; 2008).

To understand the concept of sustainable development from an educational standpoint, it may be useful to begin with the definition proposed in the report *Our Common Future* published in 1987 by the United Nations World Commission on Environment and Development (Brundtland Commission): "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987).

This definition prompts immediate, albeit implicit, reflection on the part of education researchers. Cooperation, inter-generational delivery, planning for the future, fairness, responsibility are essential points that highlight the centrality of education in the formation of subjects who can live in harmony with others and with the surrounding environment, using solidarity rather than utilitarian methods. It is clear how important it is for pedagogical research to develop educational models inspired by taking responsibility for the environmental dimension and relationship with it, in order to train individuals capable of planning and accessing their own future, through new behaviors and ideas with a responsible, ethical, and critical-reflective attitude.

To guide educational policies, the concept of sustainability cannot be understood in an abstract sense: it is necessary to develop an educational plan for the intentional transformation of what exists. In a participatory and relational sense, the concept of sustainability always implies a projected condition (Malavasi, 2010), in which the "means" and "ends" of education are placed and constructed (Dewey, 1929).

According to this viewpoint, sustainability education cannot be solved by precepts, but rather requires a renewed consideration at the level of the subject's "formative condition" throughout life in both formal and informal educational settings. In relation to education, the concept of sustainability entails a higher level of awareness and motivation that has occurred in contexts, actions, relational sensitivity, and the ecological responsibilities generated by the evolutionary circularity between local and global. This is the key to the subject's reciprocal relationship with everything around it, between the human being and every aspect of the environment in its dynamic and evolutionary nature.

In the face of a dominant paradigm of unrestricted growth that relies solely on

the quantitative dimension of what exists, the formula of sustainable development in terms of “an ecology of relationships” (Bateson, 1972; 1979) does not always succeed in inspiring temperance, moderation, a sense of limitation, harmony, and composure in human behavior. People break the rule rather than follow it; they are arrogant in their attempt to impose themselves on Nature. From a Greek perspective, the concept of limit (Latouche, 2012; Bodei, 2016) has ontological-metaphysical, ethical, esthetic, and political value, and if this value is recovered and recontextualized, it will be enhanced as a transformative device in the age of technological power, consumer society, and rhapsodic and unrestricted growth (Bauman, 2008).

As a result, appropriate pedagogical countermeasures must be proposed: for the construction of humanism based on material and immaterial dimensions, quality and quantity; and for transformational adaptation experiences that reclaim the ontological value of limitation and care as indicators of human and social resilience.

#### 4. Educating to the limits, educating to beauty

Human evolution has been marked by a contradictory condition: on the one hand, humans are innovators and bearers of a language of continuous modernization; on the other hand, they are aggressive and destructive. They are both the bearer of progress and the bearer of disaster (Natoli, 1999; 2010).

It seems that it has become difficult for human beings to live in a rapidly changing, globally and technologically mediated world, torn between euphoric drives to build a better future and scenarios of apocalyptic impotence and devastation.

In order to protect one's affections, one's health, one's work, one's future (Wilson, 2002), to enhance life forms, to consume, to socialize, human beings are accelerating, increasingly evolving, with associated negative impacts on the environment and the planet (Crutzen, 2005). Subjecting the Earth to itself, besieging territories, even prohibited ones, forcibly and continuously using renewable and non-renewable resources, humanity dominates nature in order to bend it to its advantage and deviate it from its course, eventually violating it.

According to Serge Latouche (2012), we must rediscover the sense of limitation and the search for the right measure that characterized pre-modern societies. The ancients severely punished *hybris*, the sin of excess, which has now become a moral imperative. As a result, a specific type of limitation must be accepted as a model of action (Marchetti, 2012), as a foundation of being, as a guiding principle of thought and behavior.

Education for sustainability must foster the development of individual and civic consciences founded on the recognition of finiteness and the careful and prudent management of limits. This characterization establishes an immediate connection between the principles of sustainability and responsibility (Jonas, 2002) and, in the context of a future-oriented ethical vision, practicing limitation, cultivating “right measure” temperance as an authentic lifestyle.

What cultural and pedagogical commitment is required to move in this direction?

Rediscovering sustainability as a responsibility allows us to make space for ourselves in an age of technological hyperactivity, because reality is also a product of our history, with its images and representations, the result of choices made and the values that guided them.



Responsibility for preserving and appreciating natural goods and resources (Birbes, 2011, 2016) and ensuring future-oriented management is entrusted to community and individuals' choices: changing lifestyles and day-to-day choices will also reduce the impact on the biosphere, respecting the limits and finiteness of the Earth (Ceruti, Laszlo, 1998).

This awareness is a fundamental prerequisite for a new paradigm of sustainability, inspired by an eco-centric perspective that undermines anthropocentrism and the position of domination, privilege, and superiority of humans over nature, which can be manipulated in an instrumental way. According to Paulo Freire (1970), the goal is ecological literacy, which sees humans as custodians of the earth's beauty, resources, and the forms of life that inhabit it, rather than rulers of the earth and nature. Living with deep respect for the mystery of being, gratitude for the gift of life, and humility for man's place in nature strengthens the spirit of human solidarity with all forms of life. This is the educational project of the "Ecopedagogy", which aims to teach new generations how to address real-world problems through action and dialogue in order to achieve sustainable growth (Gadotti, 2010), which is based on respect for nature, universal human rights, and a culture of peace (Gutiérrez, Cruz Prado, 2000).

To begin, it is necessary to continue cultivating wisdom, to accept responsibility for active and courageous care, to take charge of the fate of the "community of destiny" (Ceruti, Bellusci, 2020), to codify a new language that appeals to the ethics and aesthetics of human behavior, and to recall values such as sharing. In other words, it is necessary to focus on "relationalism" in order to think of oneself as part of an evolutionary network of planetary relations, to acquire *ecological alphabets* (Marchetti, 2012), to redefine new interpretative criteria, and to redefine the "well-being" culture in harmony with the planet, with the synchronization of individual behavior, and as a common good. The ethic of respect for natural assets necessitates education in the appreciation of esthetic value, the enrichment of sensitivity, listening, nature contemplation, the constant concern to avoid degradation, and the deterioration of one's home. Here, then, is the urgent need for education.

We must rediscover and teach future generations about beauty by valuing direct contact with Gaia (Lovelock, 1981) and restoring the sense of interconnection between the biosphere and humanity that binds us inextricably to a sacred unity (Bateson, 1991):

"The beauty that expresses the attained harmony of a conscious dwelling on earth [...] is a formative capacity that derives from the awareness and wisdom of the wider whole in which the human dimension is situated, and thus is never the isolated effect of an unrelated individual gesture, but of a shared cultural style that makes it recognizable and autographs its belonging to a given locality" (Bonesio, 1997, p. 119).

It is precisely here that the educational challenge of protecting all perceived living space is strengthened, through education in beauty (Dallari, Moriggi, 2016; Dallari, 2017; Marchetti, 2020), with a view to fulfilling the tasks of custody, responsibility, memory, and creativity of a new cultural and environmental *koinè*, with a view to a common destiny called the *future*.

## 5. Concluding remarks

Current pedagogical reflection aims to rethink the concept of sustainability in light of an analysis that combines the environmental, social, and human dimensions of sustainability with the goal of continuing sustainable education (Dozza, 2018; Loiodice, 2019), which interweaves knowledge, understanding, and ethics of respect and care.

The pedagogical concept of sustainability must necessarily be linked to the concept of responsibility and awareness of belonging to a complex network of relationships with the living and inanimate organisms of the world system. We are responsible for this network to the extent that we understand the dynamic evolution of the system as a result of our actions (Mortari, Silva, 2018).

The COVID-19 health emergency, as well as the planetary crisis, which is closely linked to human activity-related climatic and environmental impacts, have presented us with unprecedented contingencies that, despite their problematic nature, can serve as a catalyst for reflection in order to address some critical issues in education. Sustainability should be seen as the possibility of “changing the way” (Morin, 2020), that is, the educational paradigm.

This challenging and unavoidable invitation directly involves the pedagogical responsibility to accept the appeal of complexity and integral ecology, to initiate processes of profound reflection and to actively construct positive practices for a new pedagogical culture of human development, based on the principle of responsibility and choice, between constraints and choices (Ceruti, 2009).

We are the *heirs to the future*. Today, more than ever, there is a need for a re-orientation of education towards sustainable, conscious and not rhetorical development, which will result in a change of course through the birth of a new generation. The new “road” is up to each and every one of us. Nobody is left out.

## References

- Baranzoni, S., Lucci, A., Vignola, P. (2016). L'Antropocene. Fine, medium o sintomo dell'uomo? *Lo Sguardo. Rivista di Filosofia*, 22(3): 5-9.
- Bateson, G. (1972). *Steps to an Ecology of Mind*. San Francisco: Chandler Publishing Company.
- Bateson, G. (1979). *Mind and Nature. A Necessary Unit*. New York: E. P. Dutton.
- Bateson, G. (1991). *A Sacred Unity. Further Steps to an Ecology of Mind*. San Francisco: HarperCollins.
- Bauman, Z. (2008). *Consumo dunque sono*. Roma-Bari: Laterza.
- Birbes, C. (ed.) (2011). *Progettare l'educazione per lo sviluppo sostenibile. Idee, percorsi, azioni*. Milano: EDUCatt.
- Birbes, C. (2016) (ed.). *Custodire lo sviluppo, coltivare l'educazione. Tra pedagogia dell'ambiente ed ecologia integrale*. Lecce-Rovato: Pensa Multimedia.
- Bocchi, G., Ceruti, M. (eds.) (2007). *La sfida della complessità*. Milano: Paravia Bruno Mondadori.
- Bodei, R. (2016). *Limite*. Bologna: Il Mulino.
- Bonesio, L. (1997). *Geofilosofia del paesaggio*. Milano: Mimesis.
- Branca, D., Fabiano, E., Pau, S. (2020). Sull'antropocene. Introduzione alla traduzione di *Umano, troppo umano* di P. Descola. *América Crítica*, 4(1): 75-80.
- Brondizio, E. S., O'Brien K., Bai, X., Biermann, F., Steffen W., Berkhout, F., Cudennec, C. et al. (2016). Re-conceptualizing the Anthropocene: A call for collaboration. *Global Environmental Change*, 39(3):18–327.
- Ceruti, M., Bellusci, F. (2020). *Abitare la complessità. La sfida di un destino comune*. Milano-Udine: Mimesis.

- Ceruti, M. (2018). Una comunità di destino nel tempo della complessità. *Educazione sentimentale*, 30 (2): 17-22.
- Ceruti M., Laszlo E. (1998) (eds). *Pysis. Abitare la terra*. Milano: Feltrinelli.
- Ceruti, M. (1989). *La danza che crea. Evoluzione e cognizione nell'epistemologia genetica*. Milano: Feltrinelli.
- Chernilo, D. (2017). The question of the human in the Anthropocene debate. *European Journal of Social Theory*, 20(1), 44-60.
- Colebrook, C. (2016). What is the Anthro-Political? In Cohen. T., Colebrook, C. & Hillis Miller, J. (eds.). *The twilight of the Anthropoceneidols*. London: Humanities Press.
- Crutzen, P.J., Stoermer, E.F. (2000). The "Anthropocene". In *IGBP Newsletter*. May (41):17-18.
- Dallari, M. (2017). La bellezza può essere un obiettivo educativo? *Encyclopaideia XXI*, (48), 14.
- Dallari, M., Moriggi, S. (2016). *Educare bellezza e verità*. Trento: Erickson
- Descola, P. (2014). *Oltre natura e cultura*. Firenze: Seid Editori.
- Dewey, J. (1929) *Sources of science in education*. New York: Liveright.
- Dozza, L. (2018). Co-costruire pensiero ecologico per abitare la Terra, *Pedagogia Oggi*, 16(1), 193-212.
- Freire, P. (1970). *Pedagogy of the oppressed*. New York: Herder & Herder.
- Featherstone, M. (2020). Stiegler's ecological thought: The politics of knowledge in the anthropocene. *Educational Philosophy and Theory*, 52(4): 409-419.
- Gutierrez, F., Prado, R.C. (2000). *Ecopedagogia e cittadinanza planetaria*. Bologna: EMI.
- Haraway, D. (2015). Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making kin. *Environmental Humanities*, 6:159-165.
- Huckle J., Sterling S. (ed.) (1996). *Education for Sustainability*. London: Earthscan.
- Latouche (2017). *La Décroissance*. *Journal de la joie de vivre*, 138, avril: 14-15.
- Latouche, S. (2007). *La scommessa della decrescita*. Milano: Feltrinelli.
- Latouche, S. (2012). *Limite*. Torino: Bollati Boringhieri.
- Loiodice, I. (2019). *Pedagogia: il sapere/agire della formazione, per tutti e per tutta la vita* Milano: FrancoAngeli.
- Lewis, S. L., Maslin, M. A. (2015). Defining the anthropocene. *Nature*, 519 (7542): 171-180.
- Lovelock, J. (1981). *Gaia. Nuove idee sull'ecologia*. Torino: Bollati Boringhieri.
- Malavasi, P. (2014). *Pedagogia verde. Educare tra ecologia dell'ambiente ed ecologia umana*. Brescia: La Scuola Editrice.
- Malavasi, P. (ed.) (2013). *Progettazione educativa sostenibile. La pedagogia dell'ambiente per lo sviluppo umano integrale*. Milano: EDUCatt.
- Malavasi, P. (ed.) (2007). *L'impresa della sostenibilità. Tra pedagogia dell'ambiente e responsabilità sociale*. Milano: Vita e Pensiero.
- Marchetti, L. (2020). Educare alla bellezza. In D'Aprile G., Strongoli C.R., *Lo stato in luogo dell'Educazione*. Lecce: Pensa Multimedia.
- Marchetti, L. (2012). *Alfabeti ecologici*, Bari: Progredit.
- Malm, A., Hornborg, A. (2014). The geology of mankind? A critique of the Anthropocene narrative. *The Anthropocene Review*, 1(1), 62-69.
- Moore, J W. (2017). The Capitalocene, part I: On the nature and origins of our ecological crisis. *Journal of Peasant Studies*, 44 (3): 594-630.
- Jonas, H. (2002). *Il principio responsabilità*. Torino: Einaudi.
- MIUR (Ministero dell'Istruzione, dell'Università e della Ricerca) (2009). *Linee guida per l'Educazione ambientale e allo sviluppo sostenibile*. Roma, 14 december.
- Morin, E. (2020). *Cambiamo strada: 15 lezioni sul Coronavirus*. Milano: Raffaello Cortina Editore.
- Mortari, L., Silva, R. (2018). *Per una cultura verde. Riflessioni sull'educazione ambientale*. Milano: FrancoAngeli.
- Mortari, L. (2001). *Per una pedagogia ecologica. Prospettive teoriche e ricerche empiriche nell'educazione ambientale*. Firenze: La Nuova Italia.
- Mortari, L. (1998). *Ecologicamente pensando. Cultura ambientale e processi formativi*, Milano: Edizioni Unicopoli.
- Natoli, S. (1999). *Progresso e catastrofe. Dinamiche della modernità*. Milano: Marinetti.

- Natoli, S. (2010). *Il buon uso del mondo. Agire nell'età del rischio*. Milano: Mondadori.
- Rickards, L. A. (2015). Metaphor and the Anthropocene: presenting humans as a geological force. *Geographical Research*, 53(3): 280-287.
- Sachs J.D. (2015). *L'era dello sviluppo sostenibile*. Milano: Università Bocconi.
- Sachs W. (1998). *Dizionario dello Sviluppo Sostenibile*. Torino: Gruppo Abele.
- Steffen, W., Crutzen, P., McNeill, J. (2007). The Anthropocene: Are humans now overwhelming the Great Forces of Nature? *AMBIO: A Journal of the Human Environment* 36 (8): 614–62.
- Stiegler B. (2013) *Pharmacologie du Front national*. Paris: Flammarion
- Stiegler B (2018) *The Neganthropocene*. London: Open Humanities Press.
- Stiegler B. (2015). *Sortir de l'anthropocène*. *Dans Multitudes*, 3 (60):137- 146.
- Stiegler, B., Vignola, P, & Baranzoni, S. (2015). Uscire dall'Antropocene. *Kaiak 2* [online].
- Von Foerster, H. (1984). *Observing Systems*. Seaside (CA): Intersystem Publications.
- Wilson, E.O. (2002). *The Future of Life*. New York: Alfred A. Knopf.
- World Commission on Environment and Development (1987). *Rapporto "Our Common Future"*. Oxford: Oxford University Press.
- Ulloa, A. (2017). Dinámicas ambientales y extractivas en el siglo XXI: ¿Es la época del Antropoceno o del Capitaloceno en Latinoamérica? *Desacatos*, 54:58–73.
- UN General Assembly (2015). *Transforming our world: the 2030 Agenda for Sustainable Development*, 21 October, A/RES/70/1, available at: <https://www.refworld.org/docid/57b6e3e44.html> [accessed 21 January 2021].
- UNESCO (2015) *Rethinking Education: towards a global common good?* [ON LINE].