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EDUCATION IN THE ANTHROPOCENE. POSSIBILISM *VERSUS* UTOPIA

La educación en el Antropoceno. Posibilismo versus *utopía*

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ABSTRACT

This paper is a reflection on education within the framework of the Anthropocene, accepting as key educational challenges the problems which justify assigning this name to the current geological epoch. The urgent need to train citizens, who are actively committed to the principles and values of sustainability, derives from these problems. The focal point of this issue has two main aspects: the first focuses on transformative action as a nurturing dynamic of the training process; the second considers the competencies that education should aim to promote. On the one hand the paper reviews the updated typology of competencies which, described as 'transformative', are included in the Learning Compass 2030 (OECD, 2019). This adds complexity to the training proposal of the DeSeCo model (OECD, 2005). On the other hand, there is an analysis of the significant aspects of the typology of key competencies for sustainability, as promoted by UNESCO (2014; 2018a). From a reflective consideration of both typologies, the lack of elements (capacities) necessary to reach a critical awareness of species — whose training significantly affects what each individual can become — is

evident. The so-called 'existential competencies' of Edgar Morin (2016), which point to the most radical core of the human being, are then proposed as complementary to strengthen the consistency of the model. These competencies are not explicitly included in the, otherwise laudable, initiatives which international organisations and institutions are deploying in order to bring the Education 2030 agenda to fruition. However, it is necessary to focus attention on them within the framework of a truly transformative quality education. Therefore, incorporating them into the competency model dominant on an international level is imperative in order to radically address the gravity, and urgency, of current socio-ecological problems. Anthropological substrate, provided by a biocentric humanism, is required to carry this out. This is a substrate committed to the moral responsibility which requires preserving the dignity of life in its extraordinary diversity.

Key words: education for sustainability; critical awareness of the species; sustainability competencies; existential competencies; planetary citizenship; Anthropocene.

RESUMEN

Este artículo reflexiona sobre la educación en el marco del Antropoceno, asumiendo como retos educativos de primer orden las problemáticas que justifican asignar tal denominación al actual periodo geológico. De ellas se deriva la urgencia de formar ciudadanos activamente comprometidos con los principios y valores de la sostenibilidad. El foco de atención se sitúa en dos principales aspectos: la acción transformadora como dinámica nutricia del proceso formativo y las competencias cuya adquisición la educación debe procurar. En el texto se revisa, por una parte, la tipología actualizada de competencias que, con el calificativo de 'transformadoras', recoge el Learning Compass 2030 (OCDE, 2019), con nuevos elementos que complejizan la propuesta formativa del modelo DeSeCo (OCDE, 2005). Por otra, se analizan los aspectos significativos de la tipología de competencias clave para la sostenibilidad que promueve Unesco (2014; 2018a). A partir de la consideración reflexiva de ambas tipologías, se advierte en ellas la carencia de elementos (capacidades) necesarios para alcanzar una conciencia crítica de especie y cuya formación afecta significativamente a lo que cada persona puede llegar a ser. Para robustecer la consistencia del modelo, se proponen como complementarias las denominadas por Edgar Morin (2016) 'competencias existenciales', que apuntan al núcleo más radical de la persona humana. Estas últimas no son competencias explícitamente recogidas en las por otra parte loables iniciativas que organismos e instituciones internacionales están desplegando para llevar a buen puerto la agenda Educación 2030. Son, sin embargo, de imprescindible atención en el marco de una educación de calidad, verdaderamente transformadora. Por tanto, es preciso incorporarlas al modelo competencial dominante en el escenario internacional para afrontar radicalmente la gravedad y urgencia de las actuales problemáticas socioambientales. Se requiere el sustrato antropológico que proporciona un humanismo biocéntrico, comprometido con la responsabilidad moral que obliga a preservar la dignidad de la vida en su extraordinaria diversidad.

Palabras clave: educación para la sostenibilidad; conciencia crítica de especie; competencias en sostenibilidad; competencias existenciales; ciudadanía planetaria; Antropoceno.

1. The approach

The title of this paper highlights the coordinates which inspire its content. On the one hand, there is the magnitude of the changes, caused by humans, on the biosphere. This is the immense problem which threatens the survival of our species. On the other hand, there exists hope in the present, with a radical and deeply anthropological spiritual sense, far removed on so many occasions from simple optimism. In this hope we find the condition of possibility so that 'the horizon of justice and good transforms the educational experience into a hermeneutical practice of meaning', as claimed by Pagès Santacana (2020, p. 106).

This is the approach which gives rise to the question relating to education which is addressed in the following pages. For this purpose, the numerous pronouncements of the United Nations and UNESCO, as well as extensive literature, is taken as a reference. The evaluations of the *Education 2030* agenda, SDG No. 4 of the *2030 Agenda* (UN, 2015), are also taken into account[1] following the first five years of the period set for its implementation.

The paper is structured in seven sections. The first section is introductory and deals more fully with the aforementioned coordinates. Next, the type of education, required by international organisations and institutions, is described. In each section, two main features are addressed: firstly, the self-proclaimed 'transformative character' of this kind of education and, secondly, its focus on competencies training. After a descriptive analysis of the approach UNESCO is spreading — which is an integrative synthesis of the stance of international organisations and recognised bibliography — the paper's fifth section justifies the need to recover the cluster of competencies proposed by Edgar Morin. These are existential competencies. This is in order to fill the gaps in the competency model which dominates the international educational panorama. By way of conclusion, some aphorisms are offered with the aim of reaching a clarifying synthesis of the above. Finally, a brief epilogue outlines critical stances relating to the educational model described.

2. The coordinates

At the beginning of the century, the Nobel Prize winner Paul Curtzen coined the term 'Anthropocene' in order to designate what, in his opinion, was a new epoch in the evolution of planet Earth. This is a geological period, emerging from Modernity, which is characterised by the growing magnitude, unprecedented today,

1. We use the name of *2030 Agenda* to refer to the Sustainable Development Goals. Its complementary instruments are: the Addis Ababa Action Agenda on financing development — signed by Spain in 2015 — and the Paris Agreement on Climate Change — signed and ratified by Spain in 2016.

of the power of Humanity. As a geomorphological force, our species has shown itself capable of significantly modifying living conditions and, therefore, life as we know it today. And it continues to do so (Curtzen & Stoermer, 2000; Rockström *et al.,* 2009; Steffen *et al.,* 2015; Water *et al.,* 2016).

Since then, the use of this term has spread and has been increasingly supported by scientific evidence, which shows the cause-effect relationship existing between the collective action of the *Homo* species and the depth of current changes in the biosphere. These changes seriously risk not only the existence of the human species, but also many other species which, today, are threatened with extinction (WWF, 2020; IPBES, 2019). The reasons for feelings of despondency about this are by no means trivial. However, there is also hope. Although the dominant production-consumption model has brought us to this point, Latour (2020) highlights that, due to the Covid-19 pandemic, 'the test has been done. It is entirely possible to suspend throughout the world, at the same time and in a matter of weeks, an economic system which until now, we had been told, was impossible to stop or redirect' (p. 1).

In addition, human beings currently have at their disposal, the technology and the power — with its good and bad points — necessary to significantly influence their future as a species. This is defended by Carbonell (2018), paleoanthropologist and winner of the Prince of Asturias Award for Scientific and Technical Research, when he holds that we are confronting natural selection (with vaccines, medicine, etc.) and, for the first time, have enough knowledge to influence the future of our species. Even Harari (2016) goes further when he points out that, thanks to artificial intelligence and biotechnology, we have acquired the power to change the evolutionary trajectory of the human species itself. We are, therefore, faced with an unprecedented responsibility which would require a renewed form of humanism; a *biocentric* humanism, attentive to the intrinsic value of life, of all life.

Pieller (2020) supports this idea, underlining the correlation between the growing concern about climate change and the collective awareness of the 'need to invent another way of inhabiting the world and having a «good living»' (p. 1). He joins those who have repeatedly pointed to the need for an ideological re-foundation based on the capacities of the species to internalise a renewed hierarchy of values, with interdependence as the radical biological principle which lays the foundation of life. He holds that this requires an ontology based on diversity, cooperation, homeostasis and symbiosis, one which intertwines all living beings and their ecosystems in a single fabric, a support system which enables human life.

Interdependence, thus understood, leads us to forge alliances with other creatures and organisms in a symbolic commitment to mutually consolidate the possibilities of the future. It is at the core of the radical 'relational autonomy' which is constitutive

of the individual, an individual both autonomous and vulnerable, and inserted in a social and also physical context.

This awareness is a prerequisite for the socialisation of what Carbonell (2018) calls 'critical awareness of the species'. It encourages us to lead the way with responsible evolution and conscious progress, undertaken in a humane manner. Without it, our species is at serious risk of suffering unusual and violent episodes, even more serious than the Covid-19 pandemic, which could lead to a chain of collapses. From a critical awareness of the species it would be possible to reach the cosmic consciousness characteristic of a systemic, complex and transcendent view of reality.

Undoubtedly, all this requires an ethos which is different from the one that has prevailed in Modernity. Is change possible? Edgar Morin (2011), without abandoning a critical stance, offers a positive answer based on what he calls *five principles of hope:* the emergence of the unexpected; the generative/creative virtues inherent in Humanity; the dynamic, typical of crises, existing between regressive forces and generative forces; the essence of danger, in which, as Morin states, resides what saves, coinciding in this way with Hörderlin; and, finally, the multi-millennial aspiration for Humanity to live in harmony. For Morin these are principles which have accompanied the humanising trajectory of our species and they are, therefore, sufficiently proven from a historical perspective.

According to this thesis, crises offer an opportunity to return to radical questions and find coherent answers which enable the transition to a possible new level of civilisation. In this epoch, an epoch which is 'at the same time Anthropocene, from the point of view of the history of the Earth, and planetary, from the point of view of the history of human societies' (Morin, 2016, p. 10), education is in the foreground. How can we understand it from this perspective? What, in a situation like the one in which we are living today, is its range and functions?

An introductory statement is essential, as indicated in the final declaration of the first meeting of the *International Commission on the Futures of Education*[2]:

> As we come to terms with the anthropocene as a geological era of human-caused change to the planet, and as we grapple with a more-than-human world, the key question before us is: what do we want to become? This is a question to be asked and answered through education (UNESCO, 2020, p. 1).

A unanimous answer may not be possible although the *2030 Agenda*, approved by the United Nations (UN, 2015), produced an international consensus relating to a model of society based on universal human rights. This document offers a path for us to follow by highlighting 17 Sustainable Development Goals (SDGs). Their

2. https://es.unesco.org/futuresofeducation/

achievement would presumably drive our societies towards being in, and inhabiting, the Earth in harmony with nature and everything that populates it. This includes the ability to 'ensure inclusive and equitable quality education and promote lifelong learning opportunities for all' (Ibid., p. 17). The guidelines pertaining to this type of education are specified in the first seven goals of SDG 4, and facilitated by three more of a strategic nature. But, in addition, education is explicitly recognised as a necessary instrument for the entire agenda.

This is an educational model which is shaped by the concept of sustainable development and the approach to education which involves competencies, concepts and approaches which are deeply questioned from critical positions. Education is debated, as it has been throughout history, between possibilism and utopia. However, today, the notion of Anthropocene facilitates this debate by offering a favourable framework for synergies between different lines of reflection and work (Cózar Escalante, 2019).

3. The educational approach

There is a solid amount of literature offering a detailed analysis of the keys to the education model which has been created in response to the socio-ecological problems included in the *2030 Agenda*. This is a model which has been widely disseminated in the last two decades under the name of *education for sustainable development*. An extensive number of international authors and institutions, with UNESCO in the foreground, have taken care to articulate its elements and offer a theoretical basis — epistemological, axiological and psycho-pedagogical — in order to carry out the educational processes correctly. In our linguistic context, a long tradition of environmental education has contributed to this, with contributions from authors such as Novo (1995), Caride and Meira (2001), Leff (1998; 2007) or Elizalde Hevia (2003). Likewise, its shortcomings and contradictions have been pointed out.

The difficulty is not so much found in the available abundant and rigorous knowledge, as in the inertias, interests and mistrust which prevent change, not forgetting the controversies that it arouses. Conversely, this is something common to deep social transformations, including the transition towards lifestyles which are compatible with sustainability.

This paper does not aim to enter into the debate on the contradictions and weaknesses that the model presents, an issue which is fully explored in a documented work by professors Caride and Meira (2018). We do not spend time on the description of the model (Murga-Menoyo y Novo, 2017). Rather, our aim is to focus on the international approach, which is dominant in these first decades of the Anthropocene, assuming the perspective of the International Commission on the *Futures of Education*. In its Manifesto, which is a reflection of its institutional

humanist approach — today imbued with a concern for sustainability — it is understood as follows:

> improving the quality of human life without compromising future generations and our supporting eco-systems. In this vision, the purpose of education should be seen fundamentally in moral and ethical terms and as *sustaining and enhancing the dignity, capacity and welfare of the human person in relation to others and to nature* (UNESCO, 2020, p. 2).

This statement is compatible with the commitment given by the World Education Forum, held in Incheon (UNESCO, 2016). It is comprehensively included in SDG No. 4; a necessary facilitator of the United Nations *2030 Agenda,* as recognised by the international organisation (UN, 2017b). From this perspective, quality of education is calibrated by its contribution to the evidence of fulfilment of the 17 Sustainable Development Goals (UN, 2019), taking into account the refereed indicators for assessment (UN, 2017a; ECOSOC, 2019).

After a third of the period which was established for the fulfilment of the *2030 Agenda,* we have data on its weaknesses and strengths. Covid-19 has, without a doubt, produced a slowdown in the expected pace of implementation, coupled with a decline in achievements. Among the reasons it should be noted that 'the closure of schools (…) has affected more than 90% of the world's student population, 1.5 billion children and young people' (ECOSOC, 2020, p. 7).

Specifically, in Europe, in the case of SDG4 — quality education — the situation is in some aspects close to the planned goals, although there exist significant differences between countries. This is one of the three SDGs which have achieved the best results, although only seven of its member states are included in the world 'top twenty' (European Commission, 2019, p. 78).

The results of the evaluation help to clarify what type of society we, in Europe, are moving towards. However, they fail to explore the underlying issues of the educational model. Except for some minimal axial axes that appear, repeatedly, in UNESCO pronouncements, the human being's ideal which guides education continues to be open to different interpretations and nuance. The specific indicator itself — intended to assess the degree of compliance with target 4.7 of SDG 4, which most directly refers to the educational model — has, perhaps, a calculated ambiguity, as seen from the following statement:

> 4.7.1 Extent to which (i) global citizenship education and (ii) education for sustainable development, including gender equality and human rights, are mainstreamed at all levels in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment (UN, 2017a, p. 8).

The text explicitly refers to 'global citizenship education' and 'education for sustainable development'. These are two types of adjectival education which are so interrelated that it is very difficult to draw distinctions. UNESCO itself, when defining what each of them means, attributes to the first the function of:

> nurture respect for all, building a sense of belonging to a common humanity and helping learners become responsible and active global citizens. (…) to assume active roles to face and resolve global challenges and to become proactive contributors to a more peaceful, tolerant, inclusive and secure world (UNESCO, 2018a, p. 37).

While, in the adjoining paragraph assigns, to the second, the function of

> empower learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society, for present and future generations, while respecting cultural diversity.

Where is the difference? Although the door to different nuances seems to be open, it makes no practical sense to spend time on clarifications of this kind. In both cases, education has the function of shaping a citizenship capable of achieving the SDGs, a citizenship forged in the interrelation of society, individual, nature (Murga-Menoyo, 2020). An analysis of what specific goals, stated as competencies, are in the spotlight of the training effort could provide evidence to form a judgment on the educational model. This will be undertaken in the next section.

4. The competencies to be trained

The *Education 2030* agenda (UNESCO, 2016)[3] assumes the paradigmatic change of the traditional educational model. This meant focusing on the training of competencies, placing the emphasis not on the student but on the performance that allows him or her to show their capabilities. It is, therefore, a model which is purely behavioural in character. Knowledge, skills, values, attitudes and any other element intervening in the behaviour of an individual lose their relevance in favour of the synergies emerging when the individual, acting in response to a demand from the environment, manages to inter-relate them. The approach faced — and continues to face — great difficulties when applied in the classroom; not forgetting the strong ideological criticism it receives. However, it has acquired a seal of approval in the pedagogical language that we use today.

In the pedagogical and educational context, this Copernican change occurred amid confusion about its meaning and implementation. It demanded that teachers

3. The *Education 2030* agenda, approved at the Incheon World Education Forum, is literally included in SDG 4 of the United Nations *2030 Agenda*.

have both conceptual and methodological tools, and even a language that was previously alien to them. The OECD DeSeCo project, which was formulated between 1997 and 2003, has served as a benchmark, and has received outstanding international support in addition to being widely disseminated.

Due to the fact that it was conceived in order to direct education towards the needs of economic development, it did not fail to recognise the balance between 'economic growth with environmental sustainability, and prosperity with social equity' (OECD, 2005, p. 4) as a great collective challenge for societies. It explicitly endorsed 'the importance of democratic values and achieving sustainable development' (Ibíd., p. 7).

However, although the competencies that it highlighted are condition of possibility for the social change required by the latter, they are clearly insufficient when it comes to fully achieving this change. The explicit mention of the concept of sustainability is not included in the conceptualisation of the different competencies which are proposed as necessary. This is how UNESCO appears to understand it when advocating the formation of specific competencies for sustainability. Some competencies which are absent in the DeSeCo typology, include joint decision-making and a sense of responsibility for current and future generations (UNESCO, 2014, p. 11; 2017, p. 10; 2018b, 44-45; 120-121).

Recently, the OECD updated its initial proposal for competencies training. The *Learning Compass 2030,* within the framework of the *Future of Education and Skills 2030* project, introduces new elements which make more complex the training processes. On the one hand, it has reorganised its typology of basic competencies into three categories: cognitive and metacognitive; social and emotional; practical and physical. However, on the other hand, it considers all as the necessary basis for what it calls 'transformative competencies'. On them it places the focus of attention as the engine of development (OECD, 2019, pp. 16-17).

Transformative competencies, together with the anticipation-action-reflection cycle as a facilitating element of training, represent an interesting reinforcement of the specific competencies for sustainability promoted by UNESCO. Another reinforcement is the explicit introduction, among attitudes and values, of those 'core shared values of citizenship in order to build more inclusive, fair, and sustainable economies and societies' (Ibíd., p. 17). Although the focus remains on the economic dimension of development, the rhetorical relevance of social aspects appears to be growing.

Specifically, the role of creating a new value which encourages the reconciliation of tensions and dilemmas, and assumes responsibilities in order to 'shape a world where well-being and sustainability — for themselves, for others and for the planet — are achievable' (Ibíd., p. 16) is attributed to transformative competencies. Likewise, continuous improvement of thought and action is promoted by drawing attention to the formative importance of the anticipation-action-reflection cycle. As

is well-known, anticipating the effects, and consequences, of the present on the future strengthens the ability to make committed decisions and act more effectively with respect to individual, social and environmental well-being.

It can, therefore, be stated that this new OECD competency model is moving towards greater convergence with the key competencies for sustainability, as explored in the literature on the subject (Glasser & Hirsh, 2016; AsomBent & Hoffmann, 2013; Rieckman, 2012; Wiek, Withycombe & Redman, 2011). UNESCO, by collecting the different approaches, proposes, in synthesis, the following nine competencies: critical thinking, anticipatory thinking, strategic competency, normative competency, complex thinking, collaborative competency, competency for integrated problem solving, self-awareness, responsibility with respect to current and future generations. In the latter, which refers not only to intra-generational responsibility, but also extended (intergenerational and interspecific), we find one of the basic pillars of the axiological framework which is solidly anchored in universal human rights. This gives identity to the approach to sustainability (Murga-Menoyo, 2018).

With all this, a dense typology is generated, a forest of competencies which, in practice, runs the risk of being of little use to teachers on whose shoulders the quality of education, to a large extent, rests. The emphasis given to one or another competency in classroom practice will mark the potential of the applied model to respond to the type of education that our societies require. What does seem to emerge from these different stances is the relevance that is explicitly given to the transforming function as a hallmark of the type of education which we believe is necessary.

5. The hallmark

In the current rhetoric relating to typical education promoted by international organisations and institutions, the concept of transformation, devoid of the connotations that could associate it with the radical notion of emancipation, refers to the adaptive changes which are necessary for the sustainability of development. This is while seeking to reconcile human rights with sustained economic growth. In the line of axiological calculated ambiguity typical of these organisations and institutions, they appear to seek the transition towards a reform of lifestyles. Perhaps this could be a slower transition, but possible, within the framework of formal democracies. Furthermore, it is without negating the possibility of empowering the population.

Both UNESCO and the OECD declare transformative objective as a hallmark of the type of education that both endorse. They associate it with the dynamics which are necessary for the quality of training processes. Education is seen as a process which makes transformative learning possible. Its objective is for students to deepen their understanding of the world and question and change their vision. This should

not involve disruptive thinking, which is typical of transgressive learning (UNESCO, 2017, p. 54). This stance does not seem incompatible with the concept of empowerment as long as it is understood, according to the distinction of Ayuste González and Trilla Bernet (2020, p. 29), 'as an individual process of development of one's own inner strength and personal abilities in order to survive difficult situations and find a certain well-being'.

In the case of UNESCO, we find an example of this in the renewed framework of action for the period 2020-2030 (UNESCO, 2019) — which gives continuity to the Global Action Programme (GAP) for Education for Sustainable Development (2015- 2019) — proposed at the United Nations General Assembly (UN, 2019). The aim of this new roadmap is to correct the deficiencies and weaknesses detected in the assessment of its predecessor (UNESCO, 2018c).

This proposal includes a triple dimension of education: a) as a transforming action of people at the individual level; b) as a strategy which facilitates the essential structural change in societies, a precondition for their sustainability and c) as an instrument with a double function: firstly, to facilitate the training required for the transition to ecological technologies and, secondly, to critically analyse the effects, and problems, derived from these technologies which, on occasion, as is recognised, only provide apparent solutions (UNESCO, 2019, p. 2).

The approved text coincides, in part, with the rhetoric of 'transformative competencies' as proposed by the *Learning Compass 2030*. Like these, it includes reflection-action processes, albeit more profound. This is because it requires that students develop, and reflect on, their own perspective and ability to create new value, taking responsibility and reconciling conflicts, tensions and dilemmas (OECD, 2019, p. 25). It also requires that they understand and change social structures as necessary. UNESCO attributes to education (and the endorsement of the United Nations strengthens the legitimacy of this appeal) the function to facilitate understanding of the structural causes of *socio-ecological* problems. This is an essential driver of transformative learning. Education is, here, perceived as a process which makes transformative dynamics possible since

> with the acquisition of knowledge, learners become aware of certain realities; with critical analysis, they begin to understand the complexities of the realities; experimental exposure can lead to awareness of realities; when relevant to one's life and through difficult moments (UN, 2019, point 62, p. 17).

The transformation, thus understood, directly points to a change in both attitudes and values; to an interior, personal transition, based on the cluster of values spread by the *Earth Charter*. This is a recognised axiological reference of education for sustainability (UNESCO, 2004, p. 35). In their most radical sense, these values open the way to a *post-materialist* mentality in which the quality of life, does not

depend on accumulated goods once the basic needs linked to universal human rights have been satisfied. It is detached from the illusion that involves relying on an omnipotent techno-science. This is a great challenge, a radical problem, which currently faces education. As long as people fail to accept, and put into practice, the principles and values of sustainability in their daily lives a sustainable society will not be possible.

This is a systemic challenge that involves education. However, it also embraces politics, economy and culture. It is a challenge which, ultimately, questions each and every one of us personally. It is also a challenge which, according to María Novo (2016, p. 234), requires us to 'abandon the obsession with growth and consumption and support healthy lifestyles. This gives rise to a challenging question: how much is enough?'. This change, which is characterised by multiple implications of great complexity, cannot be undertaken without an emancipatory form of education in its deepest sense. This must be an education which is, of course, not just focused on promoting behaviours and ways of thinking. But, as a precondition, it must focus on strengthening the individual's axiological core and their critical thinking in the face of data and ideas related to sustainability in addition to the contradictions inherent in sustainable lifestyles. What's more, it must undoubtedly and ultimately focus on acting accordingly.

The widespread dissemination of an educational model with such high levels of demand does not seem easy. However, in the Report to the United Nations on the implementation of education in the framework of the *2030 Agenda,* UNESCO agrees with this approach, stating that education has

> to pay more attention to the deep structural causes of unsustainable development, in particular the relationship between economic growth and sustainable development. Education for sustainable development should promote development as a balancing act, which implies adapting to changes while respecting the values of conservation, sufficiency, moderation and solidarity. (…) Above all, it should ensure human dignity and the right to live decently (UN, 2019, point 63, p. 17).

However, perhaps there are too many ambiguities and too many doors which are open to different interpretation. The intensity of the great systemic transformation that is coming — especially in view of the acceleration of climate change and its effects — and the urgency of the change that is required to face it, make a more precise educational model necessary. This is a model with a commitment to the principles and, above all, the values of sustainability. Greater focus on training for the 'understanding of humanity', in the broadest and deepest sense of the concept, as proposed by Morin (2001), could strengthen the effectiveness of pedagogical action for quality education.

6. Pedagogical action

For the purposes of pedagogical action, the typology-synthesis that UNESCO has promoted, following several previous proposals, specifies the educational approach in the formation of the competencies as illustrated in Table 1.

Table 1
Competencies whose acquisition must facilitate education

Systems thinking competency	the ability to recognize and understand relationships, to analyse complex systems, to perceive the ways in which systems are embedded within different domains and different scales, and to deal with uncertainty
Anticipation competency	the ability to understand and evaluate multiple futures — possible, probable and desirable — and to create one's own visions for the future, to apply the precautionary principle, to assess the consequences of actions, and to deal with risks and changes
Normative competency	the ability to understand and reflect on the norms and values that underlie one's actions and to negotiate sustainability values, principles, goals and targets, in a context of conflicts of interests and trade-offs, uncertain knowledge and contradictions
Strategic competency	the ability to collectively develop and implement innovative actions that further sustainability at the local level and further afield
Collaboration competency	the ability to learn from others; understand and respect the needs, perspectives and actions of others (empathy); understand, relate to and be sensitive to others (empathic leadership), deal with conflicts in a group; and facilitate collaborative and participatory problem-solving
Critical thinking competency	the ability to question norms, practices and opinions; reflect on own one's values, perceptions and actions; and take a position in the sustainability discourse
Self-awareness competency	the ability to reflect on one's own role in the local community and (global) society, continually evaluate and further motivate one's actions, and deal with one's feelings and desires
Integrated problem-solving competency	the overarching ability to apply different problem-solving frameworks to complex sustainability problems and develop viable, inclusive and equitable solution that promote sustainable development — integrating the above-mentioned competencies

Source: UNESCO, 2018b, pp. 44-45

These eight competencies, which are mostly clusters of competencies, cover a wide range of capacities, values, attitudes, and abilities. Acquiring these competencies within education facilitates a response to our current social demands and needs.

They are, therefore, necessary and valuable. But their statements avoid, or fail to address, important principles — among them, the 'responsibility for present and future generations', previously claimed by UNESCO itself (2014, p. 12). These are essential elements which are necessary in order to shape the competencies within the framework of sustainability, with critical conscience of species. These aspects are missed and should be integrated in order to strengthen the robustness of the educational model for sustainability; a model which, in short, is called on to give special importance to *educating for the preservation of life*.

There is, for this, a previously travelled path. Its aim is to chime with the Rousseauian approach which advocates an education with a mission to 'teach to live'. In recent decades, Edgar Morin has taken up the idea and, after re-signifying it in his extensive work, concludes that 'knowing how to live, a problem that we all have, is the core of the problem and the crisis in education' (Morin, 2016, p. 62). Furthermore, since he only considers it possible to 'teach how to learn to live', Morin proposes the formation of *existential competences*. This gives an updated name to the educational achievements that are required, and thereby facilitates their inclusion in the training model that predominates today.

These are types of radical competencies which include multiple elements, and their training presents a massive challenge. It is necessary to give learners access to the acquisition of those cognitive-affective tools which assist them in their fight against error, illusion and partiality — the great basic problems of knowledge — while promoting understanding (intellectual and human) and allowing them to face uncertainty. All these elements form the basis of critical and systems thinking but, in addition, they are necessary to implement the remaining key competencies for sustainability, as listed in Table 1. Their importance requires an explicit mention in order to prevent them from being neglected.

It would be advisable, therefore, to promote their training, adding a compound competence, the 'existential competence', to those promoted by international organisations. Having the capabilities that make it up is necessary o respond to situations that, in these uncertain times, arise in the lives of each individual on three interrelated levels: the individual level; in the community/society space (as a citizen); and as a member of the *Homo sapiens* species.

Among the elements of existential competency, the capacity to 'understand humanity' is, as affirmed by Morin, the most complex. This is because, on the one hand, it has the remaining elements as a condition of possibility and, on the other hand, implies that mere intellectual understanding is not only insufficient but false. It is necessary to capture the motivations, contextualise the phenomena and consider the complexity using ethical, anthropological and epistemological frameworks. Knowledge, values and attitudes are involved. Furthermore, 'it is always inter-subjective; it requires openness to the other, empathy and sympathy (…). It recognises

the other as similar but, at the same time, as a different entity from oneself: similar due to a shared humanity, different because of personal and/or cultural singularity' (Ibid., p. 65).

Perhaps, in the training of this competency the most difficult and profound transformation that education has pending is spiritual transformation and the strengthening of consciousness. Both are necessary to face our current challenges and move us towards a new civilisational stage. This is not an exclusive weakness of the current individual, although the circumstances we experience as a species add gravity to the lack. In a planetary society whose survival requires overcoming the true threat of climate change and its effects — which put democratic systems at serious risk —, understanding humanity is a condition of possibility aimed not only at deepening democracy but also aimed at maintaining it.

It is well-known that uniting wills in order to orient them towards a common goal, which is a function of master stories throughout history, has allowed for the survival of the species and the construction of societies, thus marking the great vectors of social development. Today the mechanism does not seem radically different, although technologies are exponentially accelerating the immediacy and power of their impact. This accentuates the urgency to strengthen existential competencies. In a society prone to banality, master stories are replaced by *'fake news',* fostered by the imaginary of post-truth (Aparici y García-Marín, 2019). They polarise societies, contribute to social conflict and pose a serious problem that is undermining the foundations of the rule of law.

From this perspective, the training of the multifaceted existential competency — which has, at its core, the capacity to understand (intellectually and humanly) — stands out as a function that is extremely necessary for all transformative education. According to Morin (2001, p. 42):

> the cognitive problem has an anthropological, political, social and historical importance. If there could be a basic progress in the 21st Century, it should be that men and women stop being toys unaware not only of their ideas, but also of their own lies. It is a capital duty of education to arm everyone for the vital combat in favour of lucidity.

Only lucidity — at the antipodes of error, illusion and partiality — tinged with a 'comprehensive gaze' can counterbalance the untruth which has, today, become plausible and whose dissemination is now reaching proportions which are hardly compatible with democracy. Faced with this urgency, which is no less serious than that of the socio-environmental challenge, it seems necessary to complete the list of key competencies for sustainability proposed by UNESCO with this new cluster of capacities, the training of which is directly oriented to the most radical nucleus of the individual.

7. Conclusion: education in the anthropocene

1. Faced with the Covid-19 pandemic, new evidence adds to that which is already known, and reinforces the thesis that places quality education at the intersection of three main axis: the individual, society and nature. Its mission is to respond to a global socio-ecological challenge of unknown magnitude. This requires a profound reorientation of the dominant socio-cultural model and, consequently, it fundamentally questions the anthropological model that supports it.
2. UNESCO proposes an educational approach in line with the *2030 Agenda*. From a standard model it can be adjusted to different sociocultural contexts. It describes it in two sentences whose meaning, today, fails to demonstrate a clear distinction: education for sustainable development and education for global citizenship (planetary citizenship).
3. The standard model is specified in learning achievements which are adjusted to a top-level typology of competencies for sustainability. Each is made up of a cluster of many other competencies with multiple elements: knowledge, values, skills, attitudes, etc., which are a synergistic effect of their interrelation.
4. UNESCO, in collaboration with other international institutions, is guiding educational systems towards innovation and change within the framework of great socio-political consensus. Perhaps for this reason, it maintains a certain axiological ambiguity in relation to sustainability and thus opts for the term 'sustainable development'. This allows for different ideological nuances and, consequently, different concretions of the educational model. This flexibility limits the coherence of the training processes which are designed to respond to urgent planetary needs.
5. The standard educational model disseminated by UNESCO largely coincides with that of the OECD. It includes a typology of competencies that are insufficient to face education in the Anthropocene. Nevertheless, its significant gaps could be remedied by incorporating the *existential competence*, as Edgar Morin proposes when claiming an education oriented to human understanding. In the harmonious conjunction of the competencies that could be achieved with this reinforcement, education has an instrument capable of promoting the great transformation that is necessary for the survival of 21st Century societies.
6. In the Anthropocene, a quality education cannot ignore either the *eco-dependence* or the interdependence (relational autonomy) which characterise the human being, and neither can it neglect its function in the unfolding of spirituality and the strengthening of consciousness, as well as the critical consciousness of the species.
7. Today, education, pedagogy, as a transforming social force, follows its course between possibilism and utopia. This is a course which, inevitably, passes through the establishment of a new *biocentric* humanism. It places the human being as a modest member of the community of life that constitutes the biosphere;

with the greatness and servitude of being the only living being with a sense of moral responsibility.

8. Epilogue

The approach adopted in this paper moves within the field of possibilism. We believe that the reformism promoted by international organisations, in the most recent version, SDG4 of the *2030 Agenda,* responds to peremptory human needs and is viable. However, it is not without uncertainty and is, without a doubt, far from a radical utopia. However, this does not deny the need to continue thinking about 'another possible education' or deny its urgency; a commitment established in environmental education.

Pioneering in its response to our serious environmental problems, environmental education cultivates, in its most transformative approach, a critical gaze is characterised as a genuine education for sustainability (Novo, 2009). In its beginnings, under the auspices of UNESCO and UNEP — within the framework of the United Nations International Environmental Education Programme (1975-1995) — it attracted institutionalised international support, until the celebration of the Earth Summit (Rio 92). At this symbolic event, which included a sizeable number of international NGOs, it assumed a highly utopian approach to environmental education, stating that 'is not neutral but ideological. It is a political act, based on values for social transformation' (Foro Global 92, 1992, principle 4). As of that date, the model of education for sustainable development that international organisations disseminate today has been built.

Meanwhile, environmental education has been influenced by post-development theoretical approaches — with strong roots in Latin American culture (Mato, 2005; Gudynas, 2014; Gudynas y Acosta, 2011) — which delegitimise the dominant approach with accusations of conceptual incoherence and serious disregard for the knowledge, experiences and concerns of communities. Alternatively, these approaches opt for the term 'sustainability' as a core concept. This is a theoretical framework that motivates the need for an alternative agenda, an agenda characterised by degrowth, as in the case of the so-called *Objetivos del Buen Vivir (OBV),* in other words, Good Living Objectives (Hidalgo-Capitán; García Álvarez, Cubillo Guevara y Medina Carranco, 2019).

Even with the risk of oversimplification, it can be said that the key to this criticism lies in radical questioning of the concept of sustainable development, described as an oxymoron (Demaría *et al*., 2020). Likewise, both the approach to an education based on competencies, considered as an instrument of neoliberal productivism (Del Rey, 2012), and the 'sustained growth' advocated by SDG 8 are frontally rejected as well. Together with a host of innovative social movements — such as the *Transition*

Movement (Felicetti, 2013) and the *Global Eco-village Network* (Salamanca López y Silva Prada, 2015) — and other initiatives — like the *biophilia* (Barbiero, 2014) or the *Significant Life Experiences* (Chawla, 2001; Puig Baguer, Echarri Iribarren y Casas Jericó, 2014) — they are a reflection of cultural views which are committed to addressing socio-environmental problems.

These are genuinely transformative approaches, undoubtedly essential for enriching debate in open societies (democratic societies) as well as in multicultural contexts. However, the radical change that they propose does not, at this time, seem to attract the consensus necessary for an effective and generalised implementation. They fulfil an energising critical function and represent the most radical utopia, perhaps feasible in the long term, of education in the Anthropocene.

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References

Adomßent, M., & Hoffmann, T. (2013). *The Concept of Competencies in the Context of education for Sustainable Development (ESD)*. http://se-ed.co.uk/edu/wp-content/uploads/2010/09/130314-Concept-Paper-ESD-Competencies.pdf

Aparici, R., y García-Marín, D. (Coords.). (2019). *La posverdad. Una cartografía de los medios, las redes y la política*. Gedisa.

Ayuste González, A. y Trilla Bernet, J. (2020). Un sexto principio para el «Manifiesto por una pedagogía post-crítica». *Teoría de la Educación. Revista Interuniversitaria*, *32*(2), 25-36. http://doi.org/10.14201/teri.22384

Barbiero, G. (2014). Affective Ecology for Sustainability. *Visions for sustainability*, *1*(1), 20-30. https://doi.org/10.13135/2384-8677/1419

Carbonell, E. (2018). *Elogio del futuro: Manifiesto por una conciencia crítica de especie*. Arpa Editores.

Caride, J. A., y Meira, P. Á. (2018). Del ecologismo como movimiento social a la educación ambiental como construcción histórica. *Historia de la Educación: Revista Interuniversitaria*, 37, 165-197. https://revistas.usal.es/index.php/0212-0267/article/view/hedu201837165197/20691

Caride, J. A., y Meira, P. Á. (2001). *Educación Ambiental y desarrollo humano*. Ariel.

Comisión Europea. (2019). *Para una Europa sostenible de aquí a 2030*. Documento de reflexión. https://ec.europa.eu/commission/sites/beta-political/files/rp_sustainable_europe_es_v2_web.pdf

Cózar Escalante, J. M. de (2019). *El Antropoceno. Tecnología, naturaleza y condición humana*. Los Libros de la Catarata.

Curtzen, P. J. & Stoermer, E. F. (2000). The 'Antropocene'. *Global Change Newsletter*, 41, 17-18. http://www.igbp.net/download/18.316f18321323470177580001401/1376383088452/NL41.pdf

Chawla, L. (2001). Significant Life Experiences Revisited Once Again: Response to Vol 5(4) ¿Five Critical Commentaries on Significant Life Experience Research in Environmental Education. *Environmental Educaction Research, 7*(4), 451-461. https://doi.org/10.1080/13504620120081313

Del Rey, A. (2012). *Las competencias en la escuela: Una visión crítica sobre el rendimiento escolar*. Paidós.

Demaría, F., Acosta, A., Kothari, A., Salleh, A., y Escobar, A. (2020). El pluriverso, horizontes para una transformación civilizatoria. *Revista de Economía Crítica*, 29, 46-66. http://www.revistaeconomiacritica.org/node/1182

ECOSOC. (2020). *Progresos realizados para lograr los Objetivos de Desarrollo Sostenible*. Informe del Secretario General. Consejo Económico y Social de las Naciones Unidas. E/2020/57. http://undocs.org/es/E/2020/57

ECOSOC. (2019). *Cambios propuestos para el marco de indicadores mundiales en el contexto del examen amplio de 2020*. Informe del Grupo Interinstitucional y de Expertos sobre los Indicadores de los Objetivos de Desarrollo Sostenible. Anexo II. E/CN.3/2020/2. https://undocs.org/es/E/CN.3/2020/2

Elizalde Hevia, A. (2003). *Desarrollo Humano y ética para la sustentabilidad*. PNUMA/ Universidad Bolivariana.

Felicetti, A. (2013). Localism and the Transition movement. *Policy Studies*, *34*(5-6), 559-574. https://doi.org/10.1080/01442872.2013.862449

Foro Global 92. (1992). *Tratado de Educación Ambiental para Sociedades Sustentables y Responsabilidad Global*. http://rio20.net/documentos/tratado-sobre-educacion-ambiental-para-sociedades-sustentables-y-responsabilidad-global/

Glasser, H., & Hirsh, J. (2016). Toward the development of robust learning for sustainability core competencies, *Sustainability: The Journal of Record*, *9*(3), 121-134. https://doi.org/10.1089/SUS.2016.29054.hg

Gudynas, E. (2014). El postdesarrollo como crítica y el Buen Vivir como alternativa. En G. C. Delgado Ramos (Coord.), *Buena Vida, Buen vivir: imaginarios alternativos para el bien común de la humanidad* (pp. 61-95). CEIICH/UNAM.

Gudynas, E., y Acosta, A. (2011). La renovación de la crítica al desarrollo y el buen vivir como alternativa. *Utopía y Praxis Latinoamericana*, *16*(53), 71-83. https://produccioncientificaluz.org/index.php/utopia/article/view/3419/3418

Harari, Y. N. (2016). *Homo Deus. Una breve historia del mañana*. Debate.

Hidalgo-Capitán, A. L., García Álvarez, S., Cubillo Guevara, A. P., y Medina-Carrancio, N. (2019). Los Objetivos del Buen Vivir. Una propuesta alternativa a los Objetivos de Desa-

rrollo Sostenible. *Iberoamerican Journal of Development Studies, 8*(1), 6-57. https://doi.org/10.26754/ojs_ried/ijds.354

IPBES. (2019). *Global Assessment Report on Biodiversity and Ecosystem Services of the Intergovernmental Science-Policy*. Platform on Biodiversity and Ecosystem Services. E. S. Brondizio, J. Settele, S. Díaz, & H. T. Ngo (Eds.), IPBES Secretariat. https://ipbes.net/global-assessment

Latour, B. (2020). *¿Qué medidas de protección para evitar el regreso del modelo de producción precrisis?* Bruno Latour webpage. http://www.bruno-latour.fr/sites/default/files/downloads/P-202-AOC-ESPAGNOL.pdf

Leff, E. (1998). *Saber Ambiental. Racionalidad, sustentabilidad, complejidad, poder*. Siglo XXI.

Leff, E. (2007). *Aventuras de la epistemología ambiental: De la articulación de la ciencia al diálogo de saberes*. Siglo XXI.

Mato, D. (Coord.). (2005). *Políticas de economía, ambiente y sociedad en tiempos de globalización*. Universidad Central de Venezuela.

Morin, E. (2016). *Enseñar a vivir. Manifiesto para cambiar la educación*. Paidós.

Morin, E. (2011). *La Vía. Para el futuro de la humanidad*. Paidós.

Morin, E. (2001). *Los siete saberes necesarios para la educación del futuro*. Paidós

Murga-Menoyo, M.ª Á. (2020). El camino hacia los ODS: conformar una ciudadanía planetaria mediante la educación. *Comillas Journal of International Relations*, 19, 1-11. https://doi.org/10.14422/cir.i19.y2020.001

Murga-Menoyo, M.ª Á. (2018). La Formación de la Ciudadanía en el Marco de la Agenda 2030 y la Justicia Ambiental. *Revista Internacional de Educación para la Justicia Social* (RIEJS), *7*(1), 37-52. https://revistas.uam.es/riejs/article/view/9578

Murga-Menoyo, M.ª Á. y Novo, M.ª (2017). Sostenibilidad, desarrollo «glocal» y ciudadanía planetaria. Referentes de una pedagogía para el desarrollo sostenible. *Teoría de la Educación. Revista Interuniversitaria, 29*(1), 55-78. http://doi.org/10.14201/teoredu20172915578

Novo, M.ª (2016). La necesaria transición personal: no se cambia la vida sin cambiar la propia vida. En F. Prats, Y. Herrero, y A. Torrego (Coords.), *La gran encrucijada. Sobre la crisis ecosocial y el cambio de ciclo histórico* (pp. 245-252). Libros en Acción.

Novo, M.ª (2009). La educación ambiental, una genuina educación para el desarrollo sostenible. *Revista de Educación*, n.º extraordinario, 195-217. http://www.revistaeducacion.educacion.es/re2009/re2009_09.pdf

Novo, M. (1995). *La educación ambiental: bases éticas, conceptuales y metodológicas*. Editorial Universitas.

OCDE. (2019). *OECD Future of Education and Skills 2030*. OECD Learning Compass 2030 https://www.oecd.org/education/2030-project/contact/OECD_Learning_Compass_2030_Concept_Note_Series.pdf

OCDE. (2005). *La definición y selección de competencias clave. Resumen ejecutivo*. Proyecto de la OCDE Definición y Selección de Competencias. Fundamentos Teóricos y Conceptuales. https://www.deseco.ch/bfs/deseco/en/index/03/02.parsys.78532.downloadList.94248.DownloadFile.tmp/2005.dscexecutivesummary.sp.pdf

ONU. (2019). *Puesta en práctica de la educación para el desarrollo sostenible en el marco de la Agenda 2030 para el Desarrollo Sostenible*. Informe presentado a la Conferencia General de Unesco en septiembre de 2019 A/74/258. https://undocs.org/es/A/74/258

ONU. (2017a). *Marco de indicadores mundiales para los Objetivos de Desarrollo Sostenible y metas de la Agenda 2030 para el Desarrollo Sostenible*. Labor de la Comisión de Estadística en relación con la Agenda 2030 para el Desarrollo Sostenible. Anexo, Resolución aprobada por la Asamblea General de 6 de julio. A/RES/71/313. https://undocs.org/es/A/RES/71/313

ONU. (2017b). Educación para el Desarrollo Sostenible en el marco de la Agenda 2030 para el Desarrollo Sostenible. Resolución aprobada por la Asamblea General de 20 de diciembre. A/RES/72/222. https://undocs.org/sp/A/RES/72/222

ONU. (2015). Transformar nuestro mundo*: la Agenda 2030 para el Desarrollo Sostenible*. Resolución aprobada por la Asamblea General el 25 de septiembre de 2015 A/RES/70/1. https://unctad.org/meetings/es/SessionalDocuments/ares70d1_es.pdf

Pagès Santacana, A. (2020). Debilidades hermenéuticas y educación post-crítica. *Teoría de la Educación. Revista Interuniversitaria*, *32*(2), 95-106. https://doi.org/10.14201/teri.22379

Pieiller, E. (2020). Hacia un futuro en común. Reinventar la humanidad. *Le Monde Diplomatique*, abril, https://mondiplo.com/reinventar-la-humanidad

Puig Baguer, J., Echarri Iribarren, F., y Casas Jericó, M. (2014). Educación Ambiental, inteligencia y espiritualidad. *Teoría de la Educación. Revista Interuniversitaria*, *26*(2), 115-140. https://doi.org/10.14201/teoredu2014261115140

Rieckmann, M. (2012). Future-oriented higher education: which key competencies should be fostered through university teaching and learning? *Futures*, *44*(2), 127-135. https://doi.org/10.1016/j.futures.2011.09.005

Rockström, J. *et al*. (2009). Planetary bounderies: Exploring the Safe Operating Space for Humanity, *Ecology and Society, 14*(2), 1-32. https://www.ecologyandsociety.org/vol14/iss2/art32/

Salamanca López, L., y Silva Prada, D. F. (2015). El movimiento de ecoaldeas como experiencia alternativa de Buen Vivir. *Polis. Revista Latinoamericana*, 40, http://journals.openedition.org/polis/10715

Steffen, W. *et al*. (2015). Planetary boundaries: Guiding human development on a changing planet. *Science 347* (6223), 1259855-1- 1259855-10. https://science.sciencemag.org/content/347/6223/1259855/tab-pdf

Unesco. (2020). *Visión y marco de los futuros de la educación*. https://unesdoc.unesco.org/ark:/48223/pf0000373208_spa?posInSet=1&queryId=N-EXPLORE-52c32f0e-065f-4cd0-921a-516358c7a29c

Unesco. (2019). *Educación para el desarrollo sostenible después de 2019*. Consejo Ejecutivo 206 EX/6.II. https://unesdoc.unesco.org/ark:/48223/pf0000366797_spa

Unesco. (2018a). *Guía abreviada de Indicadores de educación para el ODS4*. Instituto de Estadística de la Unesco (UIS). http://uis.unesco.org/sites/default/files/documents/quick-guide-education-indicators-sdg4-2018-sp.pdf

Unesco. (2018b). *Issues and trends in Education for Sustainable development*. https://unesdoc.unesco.org/ark:/48223/pf0000261445

Unesco. (2018c). *Reunión Mundial sobre la Educación 2018. Declaración de Bruselas*. 3-5 diciembre. https://cerlalc.org/wp-content/uploads/2019/10/16-Reuni%C3%B3n-Mundial-sobre-la-Educaci%C3%B3n-2018-Declaraci%C3%B3n-Bruselas.pdf

Unesco. (2017). *Educación para los Objetivos de Desarrollo Sostenible. Objetivos de aprendizaje*. https://unesdoc.unesco.org/ark:/48223/pf0000252423

Unesco. (2016). *Educación 2030: Declaración de Incheon y Marco de Acción para la realización del Objetivo de Desarrollo Sostenible 4*. https://unesdoc.unesco.org/ark:/48223/pf0000245656_spa

Unesco. (2014). *Hoja de ruta para la ejecución del Programa de acción mundial de Educación para el desarrollo Sostenible*. https://www.oneplanetnetwork.org/sites/default/files/230514s.pdf

Unesco. (2004). *Actas de la Conferencia General*, 32ª reunión, 29 de septiembre-17 de octubre de 2003. Resoluciones. Volumen I. https://unesdoc.unesco.org/ark:/48223/pf0000133171_spa

Waters, C. N. *et al*. (2016). The Anthropocene is functionally and stratigraphically distinct from the Holocene, *Science, 351*(6269). https://science.sciencemag.org/lookup/doi/10.1126/science.aad2622

Wiek, A., Withycombe, L. & Redman, C.L. (2011). Key competencies in sustainability: a reference framework for academic program development, *Sustainability Science*, *6*(2), 203-218. https://doi.org/10.1007/s11625-011-0132-6

WWF. (2020). *Living Planet Report 2020. Bending the curve of biodiversity loss*. Almond, R.E.A., Grooten M. & Petersen, T. (Eds.), *WWF*. https://www.footprintnetwork.org/content/uploads/2020/09/LPR2020-Full-report-lo-res.pdf