Studies in Philosophy and Education
https://doi.org/10.1007/s11217-019-09652-5

# Training Transdisciplinary Educators: Intercultural Learning and Regenerative Practices in Ecuador

**Javier Collado-Ruano**[1] · **Mario Madroñero-Morillo**[1] · **Freddy Álvarez-González**[1]



**Abstract**
The main goal of this article is to explain the transdisciplinary training model developed at the National University of Education (UNAE) in Ecuador, based on the ancestral worldviews of *Buen Vivir* (Good Living). *Good Living* is a philosophical and political concept of the Kichwa indigenous peoples in the Andean Region, where human beings are interconnected with planet Earth and the whole cosmos. In 2008, Ecuador became the first country in the world to recognize the Rights of Nature in its Constitution, in order to face climate change and to restore the ecological footprint. This article first unifies scientific knowledge with ancestral wisdom, creating an inter-epistemological dialogue using a transdisciplinary approach. Second, the article explores the epistemological notions of transdisciplinary education: self-training, hetero-training, eco-training, and onto-training. Third, the article argues that as a result, Educational Sciences of Good Living emerged to (re)design regenerative cultures that face socio-ecological challenges of the Anthropocene age. In sum, the article argues that training transdisciplinary educators implies an intercultural, decolonial, and biocentric approach that promotes their inner spiritual self-awareness, among other perceptive, affective, emotional, rhetorical, poetic, epistemic, creative, artistic, cognitive, and philosophical dimensions.

**Keywords** Ecological footprint · Environmental awareness · Rights of nature · Regenerative development · Transdisciplinary attitude

## Introduction to the Rights of Nature in Ecuador

Currently, the Republic of Ecuador is experiencing a unique historical period. In a very short time, it has taken giants steps to preserve and regenerate its ecosystems. The Law on Environmental Management was created in 1999, where Article 2 states: "environmental

✉ Javier Collado-Ruano
javier.collado@unae.edu.ec

Mario Madroñero-Morillo
mario.madronero@unae.edu.ec

Freddy Álvarez-González
freddy.alvarez@unae.edu.ec

[1] National University of Education (UNAE) of Ecuador, Parroquia Javier Loyola (Sector Chuquipata), Azogues, Cañar, Ecuador

Published online: 27 February 2019

management is subject to the principles of solidarity, co-responsibility, cooperation, coordination, recycling and reuse of waste, use of environmentally sustainable alternative technologies and respect to traditional cultures and practices." Since then, a progressive process of environmental awareness has been integrated into different public policies, scientific research, and formal education programs. However, it is the Constitution that can be considered as the fundamental milestone to uphold environmental protection since it enshrines the Rights of Nature in its seventh chapter, as follows:

> **Article 71**. Nature, or Pacha Mama, where life is reproduced and occurs, has the right to integral respect for its existence and for the maintenance and regeneration of its life cycles, structure, functions and evolutionary processes. All persons, communities, peoples and nations can call upon public authorities to enforce the rights of nature. To enforce and interpret these rights, the principles set forth in the Constitution shall be observed, as appropriate. The State shall give incentives to natural persons and legal entities and to communities to protect nature and to promote respect for all the elements comprising an ecosystem.
>
> **Article 72**. Nature has the right to be restored. This restoration shall be apart from the obligation of the State and natural persons or legal entities to compensate individuals and communities that depend on affected natural systems. In those cases of severe or permanent environmental impact, including those caused by the exploitation of nonrenewable natural resources, the State shall establish the most effective mechanisms to achieve the restoration and shall adopt adequate measures to eliminate or mitigate harmful environmental consequences.
>
> **Article 73**. The State shall apply preventive and restrictive measures on activities that might lead to the extinction of species, the destruction of ecosystems and the permanent alteration of natural cycles. The introduction of organisms and organic and inorganic material that might definitively alter the nation's genetic assets is forbidden.
>
> **Article 74**. Persons, communities, peoples, and nations shall have the right to benefit from the environment and the natural wealth enabling them to enjoy the good way of living. Environmental services shall not be subject to appropriation; their production, delivery, use and development shall be regulated by the State (Asamblea Nacional 2008).

In general terms, the 2008 Constitution states that the full exercise of state supervision over the environment and the responsibility of the citizens in their preservation must be articulated through a decentralized national system of environmental management. In this way, public policies provide the basis for an inter-sectorial and participatory management of shared responsibility. Autonomous governments must deploy efficient mechanisms in their respective management areas and the private industry sectors must assume their corporate social responsibility role not only toward society, but also toward nature.

Regarding the education system, Article 27 states: "education will be centered on the human being and will guarantee its holistic development, within the framework of respect for human rights, the sustainable environment and democracy; it will be participatory, obligatory, intercultural, democratic, inclusive and diverse, of quality and warmth; it will promote gender equity, justice, solidarity and peace; it will stimulate critical thinking, art and physical culture, individual and community initiative, and the development of skills and abilities to create and work." Education is a human right

and a priority area in Ecuadorian public policy to ensure equality and social inclusion, and therefore is an essential component to *Good Living*. According to the economist and politician Alberto Acosta (2013), *Good Living* is a political and philosophical proposal based on *Sumak Kawsay*, an ancestral Kichwa worldview that understands human beings as an integral and interdependent part of their social and natural environment. This worldview is also known as *Suma Qamaña* among the Aymara peoples of Bolivia, Peru, Chile, and Argentina (Tortosa 2009). These countries are following this philosophy in a similar way. Therefore, Good Living is the essence of indigenous Amerindian philosophy, which is characterized by its intercultural, plurinational and decolonial vision. As Acosta adduces on this ancestral concept:

> When we talk about Good Living, we propose a reconstruction from the future utopian vision of Andean and Amazonian peoples, which should be complemented and extended by incorporating other discourses and other proposals from different regions of the planet, which are spiritually related in their struggle for a civilizing transformation (Acosta 2013, p. 47) (Author' own translation).

From this reading the world that incorporates the Andean and Amazonian worldview as the axis of epistemological, political, and educational enunciation, Good Living emerges as an alternative to Western 'development,' and as an opportunity to imagine other worlds. In this way, Educational Sciences for Good Living present a decolonial proposal whereby human beings transform their way of relating to nature (Collado Ruano et al. 2018). This *bio-literacy* pedagogy derived from the ancestral philosophy of Good Living fuses science with spirituality: it creates an ecology of transdisciplinary knowledge that allows us to rethink our planetary governability from intercultural educational practices, which, in turn, help us to unlearn and relearn, materially, intellectually, spiritually and affectively. For this reason, the Educational Sciences for Good Living must rethink all processes and phenomena linked to teacher training, research, ongoing training, and community bonding, in order to create a harmonious relationship between humans and the *Pachamama*—our Mother Earth according to the ancestral worldviews of Andean peoples. This regional ancient worldview enrich the discussions created for the UNESCO (2010) in the framework of the Climate Change Education for Sustainable Development.

In short, at the core of *Sumak Kawsay* intercultural philosophy, is the harmonious coexistence with nature. As part of this philosophy the National University of Education (UNAE) was created in 2015 to train teachers in Ecuador, the multifaceted realities that structure our world-system through a critical and decolonial lens (Wallerstein 1997). Being philosophically critical, the utopian horizon of the Educational Sciences of Good Living acquires its political, social, cultural, and existential meaning in the intercultural educational praxis of the Ecuadorian nationalities. It is in this utopian horizon of human training for Good Living that it is urgent to integrate ancestral epistemes, because their biocentric axis of enunciation of paradigms leaves behind the anthropocentric vision established by the capitalist and industrial model of the West. In this sense, the main objective of this article is to explain the transdisciplinary, complex, intercultural, and decolonial teacher training processes that our university is promoting in Ecuador, according to ancestral values of Good Living.

Here, it is important to highlight that UNAE was recognized with the "*Silver Eye*" award in 2017 for its social contribution and solidarity principles.[1] This is a high-ranking

[1] See the following newspaper's publication: https://www.eltelegrafo.com.ec/noticias/sociedad/6/la-unae-obtuvo-el-ojo-de-plata-por-su-aporte-social-y-principio-solidario.

distinction awarded by the Regional Observatory of Social Responsibility in Latin America and the Caribbean, with the endorsement of the International Institute of UNESCO for Education in America Latina and the Caribbean. In our university, promoting environmental education and strengthening environmental awareness implies a complex, transdisciplinary, integral, and holistic human approach. This epistemological approach is characterized by creating an "ecology of knowledge" that is in, between, and beyond scientific and academic disciplines (Nicolescu 2008; Santos 2009). It also implies an openness to the inner spiritual self-awareness, worldviews of indigenous peoples, and other perceptive, affective, emotional, rhetorical, poetic, epistemic, creative, artistic, cognitive, and philosophical dimensions of our human condition (Collado Ruano 2018; Datta 2016). Therefore, training transdisciplinary educators requires a combination between the scientific knowledge of an external physical universe and the spiritual wisdom of an inner emotional universe.

## Transdisciplinary Education: An Innovative Approach to Human Development

In recent decades, applying a transdisciplinary approach has become a critical alternative to organize knowledge and our socio-environmental coexistence. It is important to note that the positivist scientific philosophy that has predominated the academic world has found its epistemic limits (Nicolescu 2008). Further, over recent centuries, immeasurable, verifiable or experimental spheres have been marginalized. In other words, emotions, spirituality, and creativity, as well as many other human dimensions, have historically been neglected by a science that has evolved according to psychopaths interests of capitalism (Deleuze and Guattari 2006). According to Hathaway and Boff (2014, pp. 376–377), "we must take into account the role of spirituality and religion in trying to get out of our path of destruction and undertake another in which human beings actively participate in the preservation and improvement of the integrity, beauty and evolution of life on Earth." In this sense, many great contemporary thinkers, philosophers, scientists, and artists are arguing that our spiritual deficit is the main cause of our leads unbridled consumption of our Mother Earth's—our *sacred* Pachamama's—natural resources. Thus, the transdisciplinary methodology is used as an innovative approach to human development—particularly in educators' training processes due to its domino effect on society, by combining an ecology of knowledge within scientific knowledge and indigenous spiritual wisdom.

This transdisciplinary perspective requires the unification of our human dimensions, including our cognitive, affective, emotional, volitional, motivational, spiritual, religious, and behavioral levels of the whole personality or at a transpersonal level (Pasquier 2014; Weil 2003). Aware that human development is a fundamental condition to transform our socio-ecological reality, this article focuses on the training transdisciplinary educators. Evidently, transdisciplinary education reveals the intention to transgress the disciplinary approach, acknowledging the intrinsic dynamic and multidimensional nature of the phenomena that interact in human training. According to the nuclear physicist Nicolescu (2008), transdisciplinarity is something that transcends disciplines, that is *between*, *through*, and *beyond* disciplines. Moreover, according to the doctor Paul (2009, p. 292), this definition of learning and human development also appears in the fields of philosophy and anthropology because it is a fundamental concept in almost all traditions and spiritual worldviews. For this reason, transdisciplinary education constitutes the suitable methodology to promote the professional development in the Educational Sciences for Good Living, but also to face creatively the climate change education's challenges (Cordero et al. 2008).

This vision is present in the Pre-Socratics, and the Schelling's *Naturphilosophie Project* is a milestone that combined transcendental realism with transcendental naturalism in the nineteenth century. Another example is the ecological thinking of the psychoanalyst, post-structuralist philosopher and political activist Félix Guattari. Guattari (1989) uses the term *ecosophy* to create a new field with a monistic and pluralist approach to the complex interconnections between social and environmental spheres. Influenced by the ideas of Gregory Bateson in 1972, Guattari (1989, p. 31) notes that "there is a recomposition of social and individual practices that I put into three complementary categories: social ecology, mental ecology, and environmental ecology, and under the ethical–aesthetic sponsorship of an ecosophy." This transversal vision of the term 'ecology' became an essential reference for the construction of an ethical–political articulation capable of operating three interdependent ecological levels for a deepest critical philosophy.

In general, there are different philosophical currents of critical thinking, but they all have the common denominator of posing alternative epistemic horizons to refound the human–nature relationship. All those complex, systemic, and transdisciplinary perspectives help us to understand the transdimensional character of our human condition, which is made up of multiple dimensions and inter-retro-actions among the different levels of reality (ontological frame) and the levels of human perception (gnosiology framework). Reality is not something outside or inside us: it is simultaneously both things at the same time. Therefore, it is urgent to re-introduce the emotional and spiritual dimensions in the pedagogical models and educational curricula. The absence of these human dimensions in our human training is one of the most important phenomena that explain the current socio-ecological imbalances (Collado Ruano 2016). That is why higher education programs must work with transdisciplinary models to confront the Anthropocene age (Steffen et al. 2007), a geological period characterized by the ecological footprint left by human beings on our planet Earth (Wackernagel and Rees 1996).

In this sense, the transdisciplinary models of human training formulated by the psychologist Pineau (2004) and the anthropologist Paul (2009) are two examples that question how to live on our planet now, in a historical context characterized by technical-scientific mutations and accelerated demographic growth. In both theoretical models of human training, they seek to think in a complex way to understand the interrelationships of the whole with the parts, and vice versa. Consequently, knowledge and human learning imply the development of self-regulating, self-organizing, and self-transforming processes that involve all different dimensions that are present in our human complexity. According to the '*Tripolar Theory on Training*' formulated by Pineau (2004), which explores the life story methodology and the diverse formulations that individuals give to their formative trajectories, there are three essential processes in human training: personalization, socialization, and ecologization. This theoretical perspective led him to formulate three concepts of human training: the '*self-training*' in relation to oneself; the '*hetero-training*' in relation to the others; and the '*eco-training*' in relation to the world.

Pineau (2004, p. 130) explains that the term '*self-training*' came before the other two and favored the development of research on "empowerment of the actors for the appropriation of their power of training." The concept of '*hetero-training*' refers to the social dimension of education and training in relation to others, and the term '*eco-training*' means training processes with respect to the material environment (Pineau 2004, p. 132). At the same time, Pineau (2004) highlights that none of these training dimensions should be prioritized over another, and that is why he suggests the term '*co-training*' to describe certain educational processes focused on the interrelations of the actors, where non hierarchical inter-retro-actions occur.

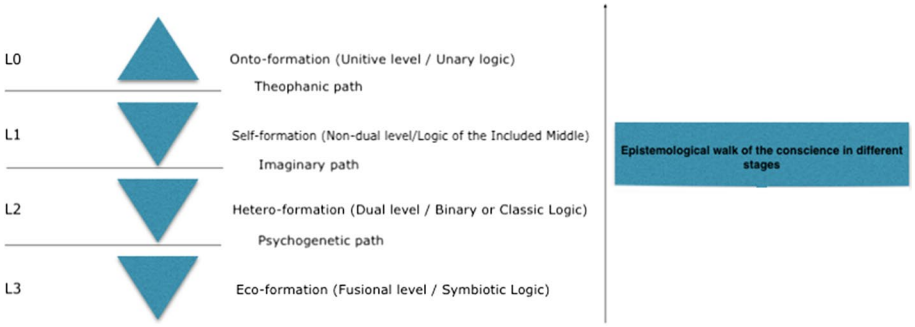


**Fig. 1** *Source*: Sommerman (2012, p. 808). Modelling of the Anthropoformation Theory of Paul (2009)

Besides Paul (2009) advocates for an articulation of all these dimensions postulated by Pineau (2004) to develop a fourth dimension called '*onto-training*.' According to his '*Anthropoformation Theory,'* Paul (2009, p. 28) argues that human training is the "global and general process (at the same time particular and unique, but also social and collective) that articulates the interactive relations between *eco-formation*, *hetero-formation*, *self-formation,* and *onto-formation.*" In addition to increasing a new dimension, Paul (2009) also proposes detailed modelling of the different levels of educational reality of the transdisciplinary subject, which is summarized in the following figure made by Sommerman (2012, p. 808):

As Sommerman (2012) summarizes in Fig. 1, the model proposed by Paul (2009) is composed of four dimensions of human training: *onto-formation* (L0), *self-formation* (L1), hetero-formation (L2), and *eco-formation* (L3). According to Paul (2009, pp. 531–535), the level of reality L0 is unitive and corresponds to the *onto-formative* dimension, where a unary logic is necessary to understand virtuality and potentiality that goes beyond all form and image at this level. L1 is a non-dual level corresponding to a *self-formative* dimension, where all potentialities contained in L0 are manifested, whose understanding is required the logic of the included middle. This logic was formulated by Lupasco (1994), in order to explain the quantic phenomena. While every elementary particle or quantic entity has wave–particle duality—integrating both classical concepts of "particle" and "wave" at the same time—the Logic of the Included Middle acts as a *quanta* integrating different elements and phenomena with a poly-logic approach. This means different logics act together in the same space and time, despite their self-contradictions. Then, the L2 level concerns dual interactions of a *hetero-formative* dimension, whose binary logic runs about life and death, the subjective and the objective, the individual and the collective, etc. Finally, L3 is the fusion level corresponding to an *eco-formative* dimension where the symbiosis is the functional basis of living systems of nature. In turn, these four dimensions are epistemologically crossed by the transdisciplinary subject through different stages: moving from *eco-formation* (L3) to *hetero-formation* (L2) constitutes the psychogenetic path of human training; moving from *hetero-formation* (L2) to *self-formation* (L1) is the imaginary path, and the passage from *self-formation* (L1) to *onto-formation* (L0) is the theophanic path of a human being's overall training (Paul 2009, p. 541).

As a whole, the multidimensional human modeling proposed by Pineau (2004) and Paul (2009) implies a transdisciplinary approach to ontological levels of nature, in order to help us face the planetary challenges that humanity has to overcome during the twenty-first century. Therefore, raise awareness about climate change means including these four

dimensions proposed for a transdisciplinary training of a complex human being in constant material, energetic, and informational co-evolution.

In this framework of the epistemological complexity of human training, the environmental educator Cottereau (2001, 2005) complements the 'eco-formative dimension' by proposing *a waltz in three times for the ecological training*. The *first beat* of the eco-formation concerns the learning of knowledge related to the environment, the natural sciences and the human sciences that cultivate the reason and spirit. The *second beat* is focuses on the practical experience of the world, where the transdisciplinary subject develops affective and emotional bonds with nature. The *third beat* corresponds to the apprehension of experience, of sensitive listening, reflection on the normally automatic gestures of our daily life, since the ecological awareness implies the feedback of the autonomous actions that we perform almost automatically. This inter-epistemological dialogue integrates the relations of humankind with nature, in harmony with the biocentric vision of Ecuador's Constitution. Thus, training transdisciplinary educators means to develop a sustainable, resilient, and regenerative mindset within children, youth, and adults (Collado Ruano 2017a).

To complement this eco-formative, transdisciplinary human modeling, the educator Galvani (2001) considers that the intercultural and transcultural exchange with indigenous cultures is fundamental, especially among American indigenous peoples. Meaningful learning is established from a "type of behavior and values that are developed at the heart of the experience through a global relationship with others and the world" (Galvani 2001, p. 92). For this reason, Galvani (2002) defines the formation as the history of the interactions and of the structural coupling of the human being with its physical and social environment. Hence, the intercultural and transcultural exchange for the development of the eco-training includes and articulates all human dimensions in the educational trajectory of a transdisciplinary subject.

Training all human dimensions is an enormous challenge for the Educational Sciences of Good Living, because it implies improvement of a multidimensional consciousness. According to Goleman (1995, p. 60) the self-conscience is a "permanent attention to what we are feeling internally. In that self-reflective conscience, the mind observes and investigates what is being experienced, including the emotions." This type of conscience is similar to the concept of 'fluctuating listening' that the psychologist Sigmund Freud recommended to those who want to devote themselves to the psychoanalysis. This notion of conscience is also similar to the concept of 'self-aware meditation' introduced by the philosopher and theologist Krishnamurti (1966), who advocates '*own light'* where self-awareness is a means for the investigative practice on oneself. Furthermore, the cosmotheandric perspective of Panikkar (2005) also constitutes a rich conception of the conscience from the perspective of the Eastern mystic practices.

On the whole, these authors invite us to develop an inner dialogue in order to know ourselves through self-awareness experimentation, which implies the observation of our own thought. Investigating the experience through introspection of our own thoughts requires a recognition of the role played by the consciousness. It is evident that self-awareness cannot be the object of a transmissible technique in its operational procedures. The spirituality and emotional universe of each individual is something unique that can not be standardized with educational curricula or pedagogical models. For this reason, it is very important to train transdisciplinary educators to integrate a multidimensional approach in the learning–teaching processes. In other words, transdisciplinary educators need to reevaluate the role of intuition, of the imaginary, of sensitivity, and of the body in the transmission of knowledge (Collado Ruano 2018).

An authentic transdisciplinary educator cannot privilege abstraction in knowledge. Rather, the transdisciplinary educator must teach how to contextualize, concretize and

globalize. At UNAE, training transdisciplinary educators means to develop a consciousness that understands our human condition with both planetary and cosmic dimensions. According to scientific consensus (Christian 2010; Spier 2011), the appearance of human beings on Earth is just one of the latest stages in the history of the Universe. The recognition of the Earth as our common home is one of the imperatives of transdisciplinary education. In this sense, the interconnection of humankind with our planet is present in Amerindian indigenous worldviews (Kopenawa and Bruce 2013, 2015). The ancestral shamans develop rituals using sacred plants (Ayahuasca, Peyote, San Pedro cactus, etc.) to heal the body, purify the spirit, and promote an awareness of interconnectivity with the cosmos, with nature, with others and with ourselves. According to Kopenawa and Bruce:

> The thought of the shaman spreads everywhere, under the earth and water, beyond heaven, and in the most distant regions of the jungle and beyond. They know the innumerable words of those places and those of all beings of earlier times. That is why they love the jungle and defend it. The mind of the great white men, on the contrary, count on the traces of tangled words towards which they look at without stopping, just like money. Thus, their thoughts cannot go far. They are suspended and it is impossible for them to get to know the jungle like us. That is why they do not mind destroying it. They keep repeating that she grows alone and that she only covers the ground. Surely, they think she is dead. But that is not true. She seems to be still and without changes because the *Xapiri* (spirits) protect her with courage (…). The jungle is alive, that is where her beauty comes from (Kopenawa and Bruce 2015, p. 468) (Author' own translation).

With this logos of contemporary ancestral thinking expressed by Kopenawa and Bruce (2015), the epistemic horizon of Educational Sciences of Good Living give rise to the following questions: How should you train transdisciplinary educators for the Educational Sciences of Good Living? How should you develop the skills and attitudes in a multidimensional manner in order to learn to co-evolve in reciprocity with our Mother Earth? What is the role of scientific knowledge and spiritual wisdom of ancestral indigenous peoples in the education of Good Living? These questions arise from the transdisciplinary concept of human training as a complex system. This transdisciplinary approach is resolutely open insofar as it goes beyond the field of the exact sciences and demands their dialogue and their reconciliation with the humanities and the social sciences, as well as with art, literature, poetry, spiritual experience and ancestral wisdom. Transdisciplinarity does not strive for mastery of several disciplines but aims to open all disciplines to that which they share and to that which lies beyond them. No single culture is privileged over another, because the transdisciplinary approach is inherently transcultural (Nicolescu 2008). That is to say, transdisciplinarity constitutes neither a new religion, nor a new philosophy, nor a new metaphysics, nor a science of sciences. Rather, the transdisciplinary ethos constitutes a new attitude based on openness and tolerance.

## Transdisciplinary Attitude: Learning and Practice of Good Living in Ecuador

This transdisciplinary attitude based on openness and tolerance is very important for the future of humanity. Climate change is pushing our planet toward a 'point of no return,' meaning that global warn is changing the natural co-evolution processes of

our ecosystems (IPCC 2014). That is to say, the increase in temperature is bringing the Earth closer to a turning point of unpredictable consequences. The ecological footprint of the prevailing capitalist system is causing very serious consequences throughout the planet (Wackernagel and Rees 1996): devastation of natural resources, extinction of biodiversity, desertification, pollution of water and air, global warming, glacial melting, acidification of the oceans, climate change, food insecurity, wars, multidimensional poverty, etc. Climate Change Education faces with all these planetary problems, and the transdisciplinary approach of the Educational Sciences of the Good Living emerges as one of the most innovative responses of recent years to protect the environment and improve the quality of life. Then, it is necessary to link scientific and spiritual dimensions to raise awareness about climate change's challenges.

The 2015 United Nations Climate Change Conference—also known as COP 21—, was held in Paris, France (UNFCCC 2015). There was an international agreement not to increase global temperatures by more than 2 °C. However, some scientists suggest that in the next 100 years there will be an increase in temperature between 3 and 5 °C, which could convert large areas of the Amazon into a savanna. In the extreme case that the global temperature exceeded 5 °C, the level of the oceans would rise tens of meters, and the ice at the poles would melt completely. For this reason, we must question the limits of a human progress based in the exploration of our ecosystems. In the short period between 1990 and 2020, it is estimated that between 10 and 38% of biodiversity will have disappeared (Oberhuber 2004). Indeed, climate change does not take into account ethnicity, race, nationality, language, gender, religion, traditions or country borders.

In this context of planetary crisis, the transcultural vision inherent in the transdisciplinary approach, emerges as a bridging of all cultures, without hierarchizing a cultural space–time over others. Further, the transdisciplinary approach also allows us to go beyond the concept of sustainable development, a concept very much exploit in recent years by the marketing of "green" products. While the notion of sustainable development focuses on the minimization of the negative human impact on Earth, the notion of regenerative development focuses on the maximization of positive human impact on Earth (Orr 2002; Pauli 2010; Wahl 2016). This concept of regenerative development is in harmony with Article 72 of the 2008 Ecuadorian Constitution, that claims "Nature has the right to be restored."

Ecuador's 2008 Constitution puts the Rights of Nature on an equal footing with Human Rights, which is a historical milestone for humanity. It is a clear example of dialogue of knowledge, where the epistemes of modern Western science merge with the wisdom of different ethnic groups, cultures, and nations that shape the complexity of this Andean country (Acosta 2013). The Constitution recognizes, in a horizontal and transdisciplinary way, that our spiritual deficit is the main cause that leads us to the unbridled consumption of the Pachamama's natural resources. Although Ecuador is a pioneer country in establishing this biocentric vision of legal norms, there are also other ancestral peoples that consider the Earth as a living, dynamic organism: its rivers are its veins, its mountains are its skin, its forests and jungles its fur… Here emerges the main argument of our article: training transdisciplinary educators in the theoretical framework of the Educational Sciences of Good Living to regenerate our planet.

For this reason, the present research makes a hermeneutic and phenomenological appropriation of those dimensions of transdisciplinary human training previously exposed. Educational Sciences of Good Living is a complex system made up of, at least, the following dimensions: ontological, ethical, aesthetic, scientific, political, spiritual and ancestral wisdom. Harmonizing the levels of Reality of the subject and the object gives meaning to the transdisciplinary attitude, which can be defined as a way

of thinking and as an interior experience, as science and consciousness, efficiency and affection (Nicolescu 2008). Thus, a transdisciplinary attitude refers to the conciliation of opposites, and its fundamental features are rigor, openness, and tolerance.

By broadening the horizon of reflection of transdisciplinary education in the learning and practice of Good Living, a crisis is generated in the structure of the concept of educational sciences and its history. Good Living is a political and philosophical proposal based on *Sumak Kawsay,* an ancestral Quechua worldview that understands the human being as an integral an interdependent part of its natural and social environment. Therefore, the promotion of Good Living in Educational institutions constitutes an essential element in the professional development of future teachers in the Andean region. The Educational Sciences of Good Living is nourished by the transdisciplinary human training with the aim of arousing a polysemy proper of inter- and transcultural contexts, while critically integrating different epistemic perspectives.

The dynamic character of Good Living provokes transdisciplinary relations in teacher and student training. Likewise, Good Living also contributes to the development of skills derived from the 'onto-formation and 'eco-formation' dimensions, since it operates as an epistemic tool that generates processes of re-signification in the relations of the being with the others, as well as a re-signification of the world, nature, and the cosmos. Hence, this dynamism further generates motions in the structure and history of the educational sciences, where the following questions emerge: What epistemologies are generated in the Educational Sciences of Good Living*?* What didactics and methods are possible in the pedagogies of Good Living? What opportunities are created in the Climate Change Education's researches? What is understood as skills necessary for Good Living? What are the best ways to learn and practice the Education Sciences of Good Living? Is it possible to establish multi-referential and poly-logical models to sow Good Living?

These questions require a transdisciplinary approach to understand the complexity of the Educational Sciences of Good Living, in order to consider our human condition with both planetary and cosmic dimensions. In this sense, the dimensions mentioned above establish a network of relations that promote the transformation based on feelings, emotions, and affections that Good Living provokes. This is illustrated in Fig. 2.

The relation between dimensions presented in the Fig. 2 is characterized by its transdisciplinary nature, meaning an intercultural epistemic diversity that exceeds the mechanistic conception of the multiple. Nodes of relations at a *trans-subjective* level are established here, and they cause a convergence of knowledge. This "ecology of knowledge" (Santos 2009) can be assumed as forms of a cultural and educational politics that tack emerging problems in contemporary educational institutions. To that end, when different epistemes are merged in a horizontal, intercultural and transdisciplinary way, the nodes are characterized for their role in establishing a network of relations (Madroñero Morillo 2012). Good Living is a concept that refers to a magnitude of time and a plural space of life, characterized by an 'opening-up' to continuous learning, where different knowledge enters into equivocity and equivalence with the aim of opening new ways of understanding education in the following way:

- *Ontological dimension*: In relation to what it means to be a teacher and student of the Good Living in continuous learning and teaching.
- *Ethical dimension*: This refers to the modes of existence of the teacher researcher and student researcher and the generation of values caused in reciprocity.
- *Aesthetic dimension*: Insofar as it is about the praxis of creative thinking and social transformation from innovation, which is evident in epistemes and pedagogies of

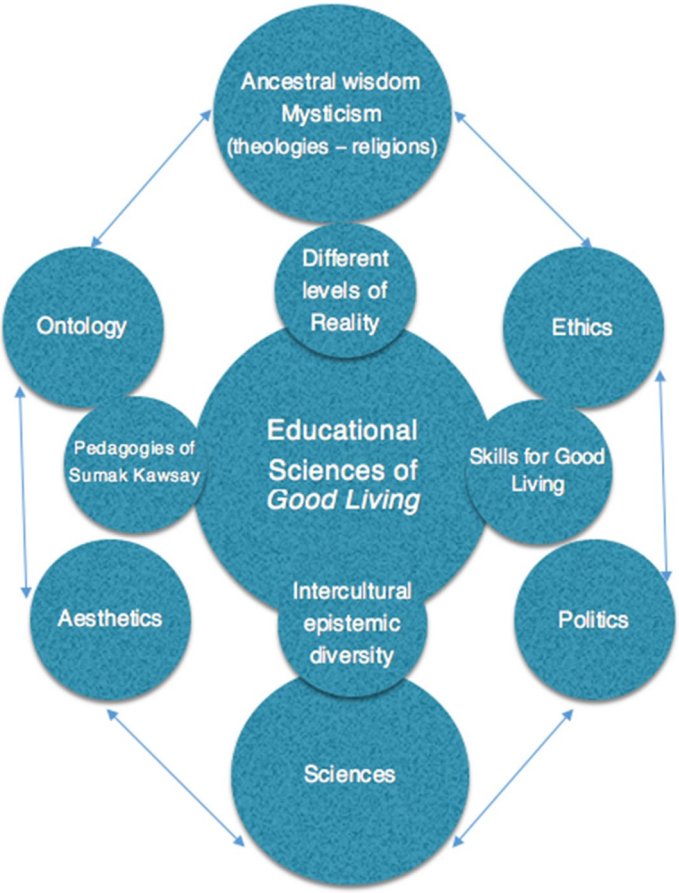


**Fig. 2** Transdisciplinary human training for the Educational Sciences of Good Living. *Source*: (Collado Ruano et al. 2018)

creativity that materialize their propositions at an imaginary, symbolic, iconographic, acoustic, sonorous, technological, conceptual, and cultural level.

- *Scientific dimension*: This refers to the dialectic relation between epistemic diversities, where transcultural concepts about scientific and technological praxis are in critical reciprocity.
- *Mysticism and ancestral knowledge*: This refers to systems of complex thinking about subjectivity (expressed in theologies, religions, feelings, emotions, passions, intuitions, sensations) with regard to spirituality and theological/political conceptions of relations between different beings.
- *Political dimension*: This refers to the decisions of learning and reciprocity in and for the production of knowledge oriented to the social re-appropriation and to the future of communality.
- *Pedagogic dimension*: This refers to the different practices, strategies, and innovative tactics of the corpus of the Educational Sciences for Good Living.

The equivocity and equivalence constitute the reciprocity within the intercultural epistemic diversity, that arouses transdisciplinarity and fosters the formation of critical nodes of relation which, in turn, cause conceptual chaosmosis (Guattari 1996) as praxis of thinking. The convergence of forces in a *continuum* of creation, equivalent to the form of relation with the Earth assumed as *Pachamama*, generates networks of matrix of senses and vital conceptual frameworks as those integrated holistically in the *Sumak Kawsay* (Madroñero Morillo 2012, 2013). This concept forms a quincunx[2] with the following concepts: (a) *Samay*, which designates breath, soul, or spirit, (b) *Munay*, which refers to the establishment of a relation with the otherness as a constituent of the trans-subjectivity of the being with others. The *Samay* is capable of establishing relations in communality (Rivera 2017), and (c) *Llankay*, which refers to the voluntary action of participation in that politics of relation of otherness, which implies to act upon oneself and others. At this point, the gestation and invention, or innovation of processes of transformation, which cause a relation in which reciprocal modes of existence are generated. Figure 3 depicts this quincunx.

In Ecuador, this relationship between ancestral worldviews and the skills needed for Educational Sciences for Good Living requires transdisciplinary learning and intercultural practice. This pedagogy of interconnectedness between the transdisciplinary subject with the sacred—nature, cosmos, and beyond dimensions—generates an emancipatory attitude. For this reason, it is important to approach the transdisciplinary training processes with the aim of better understanding the diverse formative dimensions that teachers need to boost in order to transform their socio-ecological reality. Therefore, promoting the Educational Sciences of *Good Living* means to integrate the Quechua's ancestral worldview of the philosophical and political proposal of the *Sumak Kawsay,* where there is not epistemological or spiritual distinction between the subject and the object or, in other words, between the interdependence of humankind and natural environment (biotic and abiotic factors are indivisibles) (Madroñero Morillo 2012).

Moving toward the goal of regenerative cultures requires fundamental changes in human attitudes and behaviour. Progress in this direction is thus critically dependent on education and public awareness. The concept of regenerative development is not a simple one, and there is no road map to prescribe how to proceed. Yet time is short, and it is urgent to act without delay. We must move ahead now, in a spirit of exploration and experimentation and with the broadest possible range of partners, so as to contribute through education to correcting trends that place in jeopardy our common future in the Homeland Earth (Morin and Kern 2005).

## Conclusions to (re)design Regenerative Cultures in the Homeland Earth

In recent centuries, the scientific method reduced nature into an object. We have been inhabiting a misapprehended and abstract Earth. We have transformed the co-evolution processes of the Earth, domesticating its vegetal surfaces, and gaining mastery over its animals. Today, we even have agrochemical biotechnology to genetically modify organisms or

[2] The quincunx is the base of Amerindian iconography. This refers to the relation of reciprocity between five elements in dialectic correspondence whereby it is possible to think in dimensions that are different from the general dialectic process which builds on the relation: thesis, antithesis, and synthesis. In the scheme provided by the quincunx the relation would be: thesis, antithesis, synthesis, difference, otherness. The scheme is dynamic and allows for a relation between 7 and 9 components.


**Fig. 3** Relationship between ancestrality and skills for Good Living. *Source*: (Collado Ruano et al. 2018)

influence their growth and development using the Genetically Modified Organisms (GMO) and Genetically Engineered Seeds (GES) methods. Furthermore, cloning organisms that are exact genetic copies of many animals, including humans is also commonplace. Morin, Ciurana, and Motta (2003) reflect that the four-engine "science–industry–technology–capitalism" has destroyed our human relations with nature, our *sacred* Mother Earth. Evidently, the pathologic economic interest based on the idea of human progress has caused an enormous rift between the so-called global North and South.

The ecological footprint also causes a large social footprint, since the appropriation of ecologically productive resources of the planet falls into the hands of a small fraction of humanity, to the detriment of the vast majority of the world's population. According to the calculations of OXFAM (2016, p. 2), "the richest 1% of the world population accumulates more wealth than the remaining 99% (…). In 2015, only 62 people had the same wealth as 3600 million (the poorest half of humanity)." These statistics illustrate that capitalism has failed, and we need urgent global actions to curb irrational consumption and production. In the words of philosopher Riechmann (2014, p. 24): "There are not natural resources and ecologic space enough to extend the way of production and consumption dominant today in United States, European Union or Japan to the entire planet." The global economic crisis is actually a crisis of planetary civilization. Thus, it is very important to remember the preamble of the Earth Chapter:

> "We stand at a critical moment in Earth's history, a time when humanity must choose its future. As the world becomes increasingly interdependent and fragile, the future at

> once holds great peril and great promise. To move forward we must recognize that in the midst of a magnificent diversity of cultures and life forms we are one human family and one Earth community with a common destiny. We must join together to bring forth a sustainable global society founded on respect for nature, universal human rights, economic justice, and a culture of peace. Towards this end, it is imperative that we, the peoples of Earth, declare our responsibility to one another, to the greater community of life, and to future generations.
>
> Humanity is part of a vast evolving universe. Earth, our home, is alive with a unique community of life. The forces of nature make existence a demanding and uncertain adventure, but Earth has provided the conditions essential to life's evolution. The resilience of the community of life and the well-being of humanity depend upon preserving a healthy biosphere with all its ecological systems, a rich variety of plants and animals, fertile soils, pure waters, and clean air. The global environment with its finite resources is a common concern of all peoples. The protection of Earth's vitality, diversity, and beauty is a sacred trust" (Earth Charter 2000, p. 1).

In recent decades, the sciences of complexity and the transdisciplinary approach discovered Earth as system of systems, as a biosphere, and as a cosmic speck. Focused on "the community of life," the Earth Charter (2000, p. 1) raises the whole planet in a holistic and interconnected way, understanding that it is an intimately interrelated and interdependent system that requires complex and systemic solutions to regenerate our Homeland Earth. The Earth Charter also defends that "we are a single human family and a single terrestrial community with a common destiny." According to the biologist and Nobel Prize in Medicine Laureate Christian de Duve (1995), life emerged as a "cosmic imperative" after a long and complex co-evolutionary process of matter, which finally became self-organized in the middle of the chaos. Since the emergence of life on our planet some 3.8 billion years ago, all living beings[3] (bacteria, plants, animals, humans, etc.) maintain the same basic genetic alphabet: the twenty amino acids and the four phosphate bases. In Big History (Christian 2010; Spier 2011), life on Earth is a chapter in the history of the universe, and the human being a subchapter of it. For this reason, it is necessary to overcome the anthropocentric perspective of capitalism, and create new future horizons from the biocentric approach inherent in the Good Living worldview. Training transdisciplinary educators in the theoretical field of the Educational Sciences of Good Living means to (re)design regenerative cultures, in order to transform our current relations with nature and solve climate change's problems.

Fundamental changes are needed in our values, institutions, and ways of living. The emergence of a planetary society is creating new opportunities to build an intercultural approach to face the climate change consequences already started. We must realize that when basic needs have been met, human development is primarily about being more, not having more. "Our environmental, economic, political, social, and spiritual challenges are interconnected, and together we can forge inclusive solutions," argues the Earth Charter (2000, p. 1). In this way, the Earth Charter seeks to shake the conscience of global society to take care of our planet and safeguard all life forms that reside on it. It is a matter of life or death; we are facing the greatest historical crossroads of humanity.

[3] Except for archaebacteria, prokaryotic bacteria, and viruses.

Instead of exploiting the natural resources of our planet, we need to be biomimetically inspired to solve the environmental, economic, political, social, and spiritual challenges that confront us. Nature provides lessons in survival, resilience and coevolution, as well as sophisticated diversification strategies that have been proven in a constant process of trial and error developed in about 3.8 billion years (Collado Ruano 2017b). Designing our cultures with the inherent wisdom of nature is the most efficient way to re-establish a creative fit between humanity and nature. Promoting transformative innovations for a regenerative culture is the most important objective of Educational Sciences of Good Living. But the transition to a regenerative society will require raising socio-ecological awareness. Hence the urgent need to overcome the concept of sustainable development created by techno-science and to (re)design regenerative cultures that potentiate our positive impact as an integral socio-ecological system. According to Pauli (2010):

> Highly productive Blue Economy industries, capable of generating employment for all, are on the horizon. They are based on how nature uses physics and biochemistry to build harmoniously functioning whole systems, cascading abundantly, transforming effortlessly, and cycling efficiently without waste or energy loss. These forces not only determined the parameters of life on Earth but also helped shape life itself. As we move from a linear perception to seeing a cyclic, regenerative model, we too can shape our behaviors and practices to assure that everyone's basic needs are met and that our blue planet Earth, with all its inhabitants, progresses towards an optimum future (Pauli 2010, pp. 11–12).

In harmony with Article 72 of Ecuador's 2008 Constitution, which states that nature has the right to restoration, the notion of regenerative development gives us the possibility of "restoring" the ecosystems of our Mother Earth. This new way of understanding and using the ingenuity, economy, and simplicity of nature helps us to emulate the intrinsic ecoefficiency of the ecosystem logic and, consequently, to transform at the root the productive matrix that is sustained in globalized industries. In absolute terms, "it would take 1.5 Earth planets to meet the demands that humanity makes in nature each year" (WWF 2014, p. 9) and "if we lived the lifestyle of a typical US citizen resident, we would need 3.9 planets" (WWF 2014, p. 36). These statistics speak for themselves about the systematic exploitation to which we are subjecting the Earth's ecosystems.

Therefore, the transdisciplinary approach pushes us to go beyond the United Nations 17 Sustainable Development Goals (SDGs) to be achieved by 2030. The SDGs are a cry of hope for millions of people living in extreme poverty, but also a cry of hope of our Mother Earth. In no way can we let the SDGs become a propaganda campaign or a marketing strategy to wash the image of large transnational corporations. Some civil society voices are already calling for more action, because various SDGs targets make on the Doha Declaration and other World Trade Organization (WTO) treaties on international free trade issues. In addition, Stiglitz et al. (2010) argue that we need to overcome the cognitive fallacy of GDP, because its indicators of economic growth do not take into account the degradation of our ecosystems. It is an out-date economic indicator that has brought us to current dead-end street. For example, the manufacture of tanks, weapons, and nuclear bombs generates jobs and this increases the GDP indicators. But the reforestation of meadows, jungles, and forests by volunteers has no impact on these indicators.

So, what kind of society do we want to build? What is the future that we want for humanity on our Homeland Earth? What is the role of educators to (re)design regenerative cultures? Our shared destiny on Earth forces us to collaborate in transcultural ways to start

cultural global transformations and sow regenerative seeds at a multi-level scale: local, national, regional, and international. "To improve the regenerative capacity of communities and ecosystems we need to pay close attention to the effect of our actions at multiple interconnected scales, developing a participatory, living-systems perspective," claims the environmental educator Wahl (2016, p. 265). The path of regeneration through transdisciplinary human training is one of the most important solutions to create a domino effect on our current intercultural societies.

In Ecuador, mitigating climate change effects means looking to ancestral worldviews and spiritual wisdom, inherent in the Good Living political philosophy, and creating an inter-epistemological dialogue with scientific knowledge. To recognize ourselves as participants in the co-evolutionary processes of life and consciousness, allows us to understand ourselves as the result of creative expressions of natural processes. Life on Earth is a cosmic miracle in our universe, and we have to develop educational responses to learn and practice ecological literacy. In this paper, we have explained the transdisciplinary human training that we are developing at the Higher Education level in Ecuador, in order to argue that all humans beings are fundamentally interconnected in a cosmic, physical, biological, chemical, ecological, spiritual, social, and psychological manner with the sacred—the Pachamama, our Homeland Earth. We have to re-invent education to regenerate our planet. The Educational Sciences of Good Living emerged as a utopic horizon that has already created manifold ways of learning and practice in Ecuador. Will you join us?

## References


Acosta, A. 2013. *El Buen Vivir. Sumak Kawsay, una oportunidad para imaginar otros mundos*. Barcelona: Icaria.

Asamblea Nacional. 2008. *Constitución de la República del Ecuador*. Quito: Asamblea Nacional.

Christian, D. 2010. *Mapas del tiempo: Introducción a la Gran Historia*. Barcelona: Crítica.

Collado Ruano, J. 2016. La huella socioecológica de la globalización. *Sociedad y Ambiente* 11 (1): 92–121.

Collado Ruano, J. 2017a. Educación Ambiental en Ecuador: reflexiones bioalfabetizadoras para el desarrollo sostenible. En *Visiones de Sostenibilidad*, coord. M. Martinez, 307–326. México, DF: UASLP.

Collado Ruano, J. 2017b. Learning to Co-evolve in the Anthropocene: Philosophical Considerations from Nature. Azimuth. *International Journal of Philosophy* 9: 17–30.

Collado Ruano, J. 2018. Cosmodern Philosophy: Transdisciplinary Reflections on Nature, Science, and Religion. *Ilu. Revista de Ciencias de las Religiones* 23: 57–80.

Collado Ruano, J., M. Madroñero, and F. Álvarez. 2018. La educación transdisciplinar: formando en competencias para el buen vivir. *Revista Ensaio: Avaliação e Políticas Públicas em Educação* 26 (100): 619–644.

Cordero, E., A.M. Todd, and D. Abellera. 2008. Climate Change Education and the Ecological Footprint. *American Meteorological Society* 89: 865–872.

Cottereau, D. 2001. Pour une formation écologique: Complémentarité des logiques de formation. En "Pour une ecoformation, Former à et par l'environment. *Revista Éducation Permanente* 148: 57–67.

Cottereau, D. 2005. Ecoformation: Entre soi et le monde. *En Dossier, POUR* 187: 111–117.

Datta, R.K. 2016. Rethinking Environmental Science Education from Indigenous Knowledge Perspectives: An Experience with a Dene First Nation Community. *Environmental Education Research* 24 (1): 50–66.

Deleuze, G., and F. Guattari. 2006. *Mil mesetas: capitalism y esquizofrenia*. Valencia: Pre-textos.

Duve, C. 1995. *Vital Dust: Life as a Cosmic Imperative*. New York, NY: Basic Books.

Earth Charter. 2000. *The Earth Charter*. San José: CTI.

Galvani, P. 2001. Ecoformation et cultures amérindinnes. En Pour une écoformation: Former à et par l'environment. *Revista Education Permanente* 148: 85–95.

Galvani, P. 2002. A autoformação, uma perspectiva transpessoal, transdisciplinar e transcultural. En *Educação e transdisciplinaridade II*, Org. A. Sommerman et al., 93–122. São Paulo: TRIOM.

Goleman, D. 1995. *Inteligência Emocional*. Rio do Janeiro: Objetiva.

Guattari, F. 1989. *Les trois écologies*. Paris: Galilée.
Guattari, F. 1996. *Caosmosis*. Buenos Aires: Manantial.
Hathaway, M., and L. Boff. 2014. *El Tao de la liberación. Una ecología de la transformación*. Madrid: Trotta.
IPCC (Intergovernmental Panel on Climate Change). 2014. *Climate Change 2014: Impacts, Adaptation, and Vulnerability*. New York, NY: Cambridge University Press.
Kopenawa, D., and A. Bruce. 2013. *The Falling Sky. Words of a Yanomami Shaman*. Cambridge, MA: The Belknap Press.
Kopenawa, D., and A. Bruce. 2015. *A queda du céu. Palavras de un xamâ yanomami*. São Paolo: Companhia das letras.
Krishnamurti, J. 1966. *A mutação interior*. São Paulo: Cultrix.
Lupasco, S. 1994. *O Homem e suas Três Éticas*. Lisboa: Instituto Piaget.
Madroñero Morillo, M. 2012. *Antropología de lo inaparente. Saberes ausentes, epistemologías invisibles*. Manabí: Ciberalfaro.
Madroñero Morillo, M. 2013. "Huacakiruna. Gente-pensamiento-creación". Uturungu Achachi. *Revista de Pueblos y Culturas originarios* 2: 64–73.
Morin, E., E. Ciurana, and R. Motta. 2003. *Educar en la era planetaria*. Barcelona: Gedisa.
Morin, E., and A. Kern. 2005. *Tierra-Patria*. Barcelona: Kairós.
Nicolescu, B. 2008. *O Manifesto da Transdisciplinaridade*. São Paulo: TRIOM.
Oberhuber, T. 2004. *Camino de la sexta gran extinción. En Ecologista, no 41*. Madrid: Ecologistas en acción.
Orr, D. 2002. *The Nature of Design. Ecology, Culture, and Human Intention*. Oxford: Oxford University Press.
OXFAM. 2016. *Una economía al servicio del 1%. Acabar con los privilegios y la concentración de poder para frenar la desigualdad extrema*. Informe no 210 de OXFAM, 18 enero 2016. https://www.oxfam.org/sites/www.oxfam.org/files/file_attachments/bp210-economy-one-percent-tax-havens-180116-es_0.pdf.
Panikkar, R. 2005. *De la mística. Experiencia plena de la vida*. Barcelona: Herder.
Pasquier, F. 2014. Au-delà de la science et de la spiritualité, le Transpersonnel. *Bulletin du transpersonnel, no* 117: 23–25.
Paul, P. 2009. *Formação do sujeito e transdisciplinariedade: história de vida profissional e imaginal*. São Paulo: TRIOM.
Pauli, G. 2010. *The Blue Economy. 10 Years, 100 Innovations, 100 Million Jobs*. Taos: Paradigm Publications.
Pineau, G. 2004. *Temporalidades na formação*. São Paulo: TRIOM.
Riechmann, J. 2014. *Un buen encaje en los ecosistemas. Segunda edición (revisada) de Biomímesis*. Madrid: Ed. Catarata.
Rivera, S. 2017. Comunalidades anarquistas. Una aproximación testimonial. In *Asociación latinoamericana de antropología*. Retriewed from: http://www.asociacionlatinoamericanadeantropologia.net/congreso2017/Rivera.%20Comunalidades%20anarquistas.pdf.
Santos, B. 2009. *Una epistemología del sur*. Mexico: Siglo XXI. CLACSO Ediciones.
Sommerman, A. 2012. A interdisciplinaridade e a transdisciplinaridade como novas formas de conhecimento para a articulação de saberes no contexto da ciência e do conhecimento em geral: contribuição para os campos da Educação, da Saúde e do Meio Ambiente. Salvador. Ph.D. Thesis.
Spier, F. 2011. *El lugar del hombre en el cosmos. La Gran Historia y el futuro de la Humanidad*. Barcelona: Crítica.
Steffen, W., P. Crutzen, and J. McNeill. 2007. The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature? *AMBIO: A Journal of the Human Environment* 36 (8): 614–621.
Stiglitz, J., A. Sen, and J.P. Fitoussi. 2010. *Mis-Measuring Our Lives. Why GDP Doesn't Add Up. The Report by the Commission on the Measurement of Economic Performance and Social Progress*. New York, NY: The New Press.
Tortosa, J.M. 2009. *Sumak Kawsay, Suma Qamaña, Buen Vivir*. Madrid: Fundación Carolina.
UNESCO. 2010. *The UNESCO Climate Change Initiative. Climate Change Education for Sustainable Development*. Paris: UNESCO Press.
UNFCCC (United Nations Framework Convention on Climate Change). 2015. *Adoption of the Paris Agreement*. Paris: UNFCCC.
Wackernagel, M., and W. Rees. 1996. *Our Ecological Footprint. Reducing Human Impact on the Earth*. Gabriola Island: New Society Publishers.
Wahl, D.C. 2016. *Designing Regenerative Cultures*. Axminster: Triarchy Press.
Wallerstein, I. 1997. *El futuro de la civilización capitalista*. Barcelona: Icaria.

Weil, P. 2003. *L'Art d vivre la vie*. Letrativa: Éditions du Rocher.
World Wildlife Fund (WWF). 2014. *Living Planet Report 2014. Species and Spaces, People and Places*.