

Renewal of Ecological Ethics: Educational Aspects from a Multicultural Approach to Human-Nature Interactivity

by Izaskun Petralanda

Izaskun Petralanda is professor of ethics, Faculty of Science, Central University of Venezuela. She possesses a BA in biology from Central University of Venezuela, an MA in education from Catholic University Andres Bello, and an MA and doctorate in tropical public health, Harvard University.

Environmental ethics dilemmas are multidimensional problems that occur in both biological and cultural contexts. Their comprehension requires overcoming the biology/culture dichotomy and recognizing biogenesis and ethogenesis as mechanisms that act together to transform humans and the environment. This requires articulating conceptual and attitudinal contexts of a different nature and greater complexity, which frequently follow pluricausal and plurilineal logical patterns involving different types of rationality (i.e., logical/empirical, hermeneutical, and symbolic or poetic). In this work we analyze some aspects of the ecological ethics that Amazonian Aboriginal cultures have developed in order to understand, prevent, and reduce the non-desirable consequences of human interventions on the environment, particularly their ontological perspective of *being-person-with-the-world* in contrast to *being-person-in-the world*. From there, the work reviews the concept of *environmental solidarity* as an essential human value to be incorporated into the educational policies of ethics education.

“El mundo es una flor
que comenzó con Dios,
quien lo creó
bonito y lo cuidó,
pero al tiempo
se marchitó,
de puro abandono se llenó.
Ahora todo el mundo llora,
por la flor perdida,
que solo Dios cuida.”
by Unai Paz

“The world is a flower
that began with God,
who created it
beautiful and cherished it,
but after time
it withered,
and became filled with neglect.
Now the whole world cries,
for the flower lost
that only God cares for.”
Translation by Thomas Heyd

Introduction

The number of deaths and disabilities directly generated by violence (i.e., suicide, homicide, and war) has alarmingly increased over the last fifty years of the twentieth century (WHO, 2002). Projections made by *The Global Burden of Disease and Injury Project* indicate that war and interpersonal violence will be the main cause of death and disease by the year 2020, with depression and psychiatric illness in second place compromising the functional capacity of tens of millions of people worldwide (Bloom, 1999). These data show that, despite all the scientific and social achievements of the modern era, including the increased average human life expectancy at birth from 46.5 years in 1950 to 65.2 years in 2002, the quality of human life, particularly the ability to relate to others, has deteriorated.

Human violence expresses impairment in the *human ability to relate* either to the *self* or to *other(s)*, damaging individuals and societies. Violence towards the environment is called *ecoviolence* (Westra, 2008) and reflects what some ecologists describe as “the cognitive schizophrenia of understanding the world in one manner and yet acting as if it were entirely different” (Pinillos, 2005: 236). Such ecoviolence causes the exhaustion of energy and natural resources, worldwide environmental destruction, and climate change that put the whole bio-geological stability of life on planet Earth in serious peril (Fely, 2007; Brown, 2007; Motherway, 2007; Blaschke, 2007).

The human ability to relate, because it expresses the perceptions that people have from other people or Nature, is deeply related to human dignity and has a tremendous effect on the respect given to human rights and nature’s rights. In turn, dignity and rights are central to an ethical analysis that seeks to ameliorate the current problems facing humankind, such as those described above.

Such an ethical analysis requires consideration of the ethos of modern civilization in seeking ways to improve the human ability to relate and to avoid violence. As Diez-Hochleitner and Ikeda indicate:

[T]he history of humanity shows a rising line that traces the undeniably immense material and cultural achievements made over a long and difficult march through millennia ... [I]t also shows how often historical trends around the world have been seriously crippled by the ignorance and selfishness of too many ... Our task and renewed vocation is to be carriers of hope for the future ... (to) become partners in our commitment to contribute to a reversal of the present most dangerous trends (Diez-Hochleitner & Ikeda, 2008: 126).

In this article we present some educational guidelines used in two ethics education programs designed to improve the human ability to relate, both to humans and to nature, through an ontological perspective that promotes assertive relational skills and prosocial moral development.

On the Ontology of the Human Ability to Relate: Cultural Diversity

The human ability to relate expresses itself through different *human recognition patterns*, or procedures by which each person recognizes him/her as *self* and differentiates from *other(s)* as *non-self*. According to Honneth (1997), human recognition patterns affect the emotional, cognitive, and social dimensions of personality, each with different *relational needs* (i.e., affective, moral, or social) that are deeply involved in individual and social development.

The type of recognition pattern that a person uses to satisfy his/her relational needs makes it more or less difficult to establish authentic relationships either to-self or to-

RETHINKING EDUCATION AND TECHNOLOGY

other(s). Positive or appreciative recognition patterns generate human relationships that are caring, loving, based on solidarity, and respectful of the rights of others, which has the effect of increasing people's self-confidence, self-respect, and self-esteem, and leads to a positive impact on individual and public health. In contrast, negative or depreciative recognition patterns generate human relationships that are exploitative, disrespectful of others' rights, and which deteriorate human dignity as well as the physical and social integrity of individuals and communities (Petalanda, 2007).

The human ability to relate is rooted in the ontological perspective that each person has about the meaning and value of life. Ontological perspectives that base the value of human life on the assumption that there is no relational condition for humans generate recognition patterns that are negative or depreciative, demanding denial, or elimination of the-other(s) as the only approach to the survival of the-self. This *selfish-self* ontology denies the possibility to establish positive relational styles or to achieve solidarity, as in the existentialist's ontological perspective proposed by Sartre, called here the selfish-self ontology of "being-the-only-person-in-the-world," which posits that:

[O]riginally, the-other possesses me, it is my enemy, I am in danger in front of him: "hell is the others"... loving expectancy is impossible ... The-other as such is never my brother ... The-other is "our evil twin," "the being form another species" as Sartre said ... and this denial and exclusion make human relations an unsurpassed fight, liquidation and endless competition that extends over all orders of existence ... as pure polemics or war, without the possibility of "harmony" or positive bonds, of reciprocal implication between the-self and the-other (Gonzalez, 2001: 221).¹

Societies based on such a selfish-self ontological perspective generate selfish economic

and political systems that deny or destroy individuality (i.e., selfish collectivisms) or reject generosity or empathy to anyone but to-self (i.e., possessive individualism or, at its best, illustrated selfishness). In such societies, very easily, the main purpose of human self-realization becomes not only to possess the-self but also the individual possession of goods and things (Etxeberria, 2005) or the "endless avidity ... [so] that people, even when satiated, are avid for material goods without knowing what they want" (Zambrano, 2004: 89). Solidarity is understood as "the unification that two or more people feel when they have in common to be dominated by a third, or when two or more people are united to dominate others. (...) Human relations are conceived as a relation among contraries necessarily exclusive" (González, 2001: 222).

Such societies generate economic and political systems that deeply affect Human-Nature relationships because "the self realization projects come to be possessions competition projects, which imply an exploitative relation with nature, breaking any perspective for solidarity towards it" (Etxeberria, 2005: 125). Individuals and communities increasingly start to consider themselves absolute owners and possessors of all Nature's goods, tangible or intangible, for their own enjoyment and for the sole satisfaction of their own needs. It is a perspective that supports the Baconian metaphor of Nature as "Eros"—an enemy to dominate and subjugate. This metaphor that has been particularly catastrophic in the management of rainforest resources over the last thirty years, causing disruption of the stability, complexity, and biodiversity of Amazonian ecosystems through indiscriminate soil erosion and mass and species extinctions which will take thousands of years to correct (Moran, 2000).

In contrast with the selfish-self ontology just described, there are other ontological

RETHINKING EDUCATION AND TECHNOLOGY

possibilities that call for authentic relationships as the meaning of human life and of the human relational condition, generating positive recognition patterns and *relational styles* (Maslow, 1972; Rogers, 1981; Lévinas, 1995; Etzeberria, 2005; Diez-Hochleitner, 2008; Petralanda, 1993; Negrete, 2004). This is the case of the *Amazonian Aboriginal People* whose recognition patterns are based on the assumption that all living and non-living beings are connected and interrelated. Therefore, selfish exploitation of others, particularly Nature, is not an acceptable way of living (Eguillor, 1994; Mosonyi, 2004; Negrete, 2004; Petralanda, 2005).

Amazonian Aboriginal People's relational styles involve networks of interconnected knowledge, qualitatively different—i.e., biological, cultural, empirical, sociological, psychological, and spiritual—integrated in very complex yet unified and harmonious systems that support stability in the web of life on Earth. Such constructs are called *Amazonian Aboriginal relational Bioculturomas* (AARB). They value and respect the principles of uncertainty, complexity, precaution, and a responsibility to approach relationships while seeking to avoid the disruption of the delicate, dialogue-based, relational equilibrium that must exist among humans, forest spirits, good and evil. The AARBs resemble in their general structure that of *Systems Biology* whose non-reductionistic approach to the study of life seems to be particularly suitable to correct current environmental problems, including climate change (Oltvai & Barabasi, 2002; Trewavas, 2006).

AARBs are based on thousands of years of meticulous observations, experiments, and trials seeking to improve people's quality of life without disrupting the fragile Amazonian ecosystems, biodiversity, or biocomplexity (Estrella, 1996; Moran, 2000). It has been the invention and systematic use of unique environmental conservation strategies, aimed at managing and repairing Amazonian forest

ecosystems, that has kept the rate of extinction relatively low (Moran, 2000; Narbaiza, 2004). AARBs seem to be the reason why (contrary to the wilderness myth and in spite of systematic human interventions in South America's rainforests from the Holocene period to date) it has been possible to conserve the Amazon as the largest area of virgin forest of the world producing 40 percent of the oxygen on Earth (Uhuöttöja, 1983; Moran, 2000; Callicott et al., 2007).

From an ontological perspective, AARBs combine the outer and inner human worlds using appreciative recognition and relational patterns that emphasize being-person-*with*-the-world. It is no longer the-self *or* the-other(s) but the-self *and* the-other(s). This perspective requires one to leave behind the-selfish-self ontology and to embrace an attitude of unarmed hospitality towards the-other(s), similar to what some Western philosophers have described as “the difference that is not indifference ... the endless obligation (to relate) ... not reduced to my responsibility towards the-other, (but) also my inspiration by the-other” (Gabilondo, 2001: 216). The-other(s) is valued not as an object of the-self's affection or interests but as an openness of the-self, a freely chosen rupture of the-self's limits. This non-selfish-self perspective of being-person-with-the-world opens new possibilities to the human ability to relate and might allow us to solve the “deepest problem of ethics” by balancing fairly rational selfishness and rational benevolence (Aranguren, 1997: 284).

The non-selfish-self perspective also recognizes and appreciates diversity, interdependence, and proximity as an essential part of the web of life. Therefore, the enormous diversity of ways of being-person-with-the-world is not reduced to one universal way by actively “identifying experiences of a specific group of subjects as the paradigmatic case of the human like” (Benhabib, 2006: 176). On the contrary, the world is perceived as a com-

munity of living beings that interact among themselves, and therefore authentic interactivity is highly valued. It is a perspective that incorporates care and love as essential traits to fully become person-with-the-world. The-self's freedom is therefore not unlimited because, as is expressed in the *Ethical Code of Pemon People*, "[people's] natural freedom [finds] barriers that must be respected in order to live peacefully in a diversified cosmos" (Gutiérrez, 2001: 342).

The respect for Nature of the non-selfish-self perspective indicates the beginning of a kind of human wisdom that respects the deepest sense of human life, dignity, and freedom. The human-centered Baconian metaphor for Nature is rejected in favor of one proposed by Lovelock (1991)—Nature as Gaia, a living planet, a friend to care for and respect. Upon it, human life and actions acquire a new perspective of time because, as theoretical physicist Dyson proposed:

[T]he destiny of our species is formed by the consideration of survival in six different scales of time. To survive means to compete successfully in six time scales. In the scale of years, the unit is the individual. In the scale of decades, the unit is the family. In the scale of centuries, the unit is the tribe or nation. In the scale of millennia, the unit is culture. In the scale of tens of millennia, the unit is space. In the scale of eons, the unit is the matrix of all the life on our planet. Each human being is the product of his [or her] adaptations on the six time scales. For that reason conflicting loyalties are deep in our nature. [For] the purpose of surviving it has been necessary that we were loyal to ourselves, to our families, our tribes, our cultures, our species and our planet. If our psychological impulses are complicated it is because they are formed by complicated and conflicting exigencies" (Dyson, 1994: 362).

It is the eonic time scale in which the mutability of nature, its living face, becomes

visible and it is with this understanding that sustainable human-nature relationships must be sought.

On the Renewal of Ecological Ethics: A Multicultural Approach

The non-selfish-self perspective of being-person-with-the-world, values interactivity and interdependence, and provides new grounds on which to develop harmonious and sustainable interactions between humankind and nature. Such a perspective might contribute to a substantial renovation of ecological and environmental ethics (*ecoethics*), helping life's well-being to blossom on Earth. This is the relational perspective proposed by the ethics of caring and listening (Gilligan, 1994; Benhabib, 2006), the cordial rationality ethics proposed by Cortina (2006), the deep ecological ethics proposed by Leopold, Naess and Sessions (Kwiatkowska and Issa, 1998; Speranza, 2006), and it also represents Amazonian Aboriginal ecoethics (Petalanda et al., 2004).

This perspective contrasts with the remarkable anthropocentrism of ecoethics when based on the-selfish-self or being-the-only-person-in-the-world ontology, which many ecologists and ecoethicists are seeking to overcome because its ontological and referential center to a certain type of "anthropos":

[T]he human subject is socially defined by modernity ... [therefore] the present situation in human societies, and the state of the planet as a whole, forces [us] to review the model of anthropocentrism ... ecological ethics [requires] a fundamental change in the perception ... of humankind in relation with ... other human beings, the set of living beings with whom we share this existence, with the non-living support systems with which life interrelates (Sosa, 1998: 121).

RETHINKING EDUCATION AND TECHNOLOGY

In the case of the Amazonian Aboriginal ecoethics, the emphasis is on non-anthropocentric interactions and interdependence between humankind and nature, upon which survival patterns and lifestyles are based. For example, for the *Uhuöttöja (Piaroa) People*, the Earth is where “the heart of the world” is located—therefore to hunt, to fish, or to tend crops are not only activities of subsistence but also they are activities filled with meaning through which one can relate and communicate with nature. For the *Yanomami People*, life’s meaning is intimately connected with nature, the *uríhi* (forest) is not only a set of elements formed of soil, plants, and animals that can be useful for human subsistence but also part of human beings (Eguillor, 1984; Finkers, 1991). To the *Pemon People* nature is as important for human beings as soil is for the tree, because life is an integral phenomenon, or stated differently—“life in its total habitat” (Gutiérrez, 1996).

A renewal of ecoethics demands not simply that we align ethical knowledge with the economic and sociological perspectives of environmental problems, but that we achieve a change in human relational patterns towards nature, away from the anthropocentric view of the selfish-self and closer to the non-selfish-self perspective. Such change is a complex process that requires the articulation of different dimensions of reality (i.e., biological, social, spiritual, cultural), each of them with a large variety of components, values, relations, interdependencies, and rationalities (i.e., logical/empirical, hermeneutic/symbolic, and poetic), aiming to propose intelligent and innovative models to manage and use nature’s resources without risking the stability of life on Earth, at present or in the future.

On Education for Ecoethics Renewal: General Guidelines

As indicated above, the complex process of renewing ecoethics—including conceptual

and attitudinal changes in the human ability to relate—could be addressed through specific ethics education programs with a broad cultural perspective that emphasizes a non-selfish-self ontological perspective. In the rest of this article, we describe the general guidelines of two ethics education programs developed at the Faculty of Science of the Central University of Venezuela and at the Technical School “Madre Mazzarello” based on the considerations previously described in this article.

One program was initiated in 1996 at the Technical School “Madre Mazzarello” as a three-year technical degree for teenagers and young adults (16 to 20 years old) from different Amazonian populations and cultures (i.e., Yanomami, Yek’wana, Wöhtuja, Pemòn, Jiwi, Baniva, Bare, Yeral, and Criollo). To date, the program has graduated over a hundred technicians, all of them working in Intercultural Primary Health Care Services in multicultural settings of Amazonas or pursuing higher academic degrees in health related careers (Eguillor et al., 2005; Petralanda et al., 2007).

The other program opened in 1999 as a course on Bioethics for Sciences and Technology for university students (19 to 23 years old) at the Faculty of Science of the Central University of Venezuela and it has served as the academic basis for the creation, in 2007, of the Ethics Unit for Sciences and Technology. Over two hundred students of the natural sciences (i.e., physics, chemistry, mathematics, biology, and computational sciences), law, and education have been enrolled in the course, and it is currently offered as an inter-faculty course at the University (Petralanda et al., 2005; Petralanda, 2006).

The educational goal of both programs is to develop the moral personality of students with a focus on strengthening their moral sensitivity, moral judgment, and moral activity, through an intimate ontology built and expressed in quotidian ethical and socio-

RETHINKING EDUCATION AND TECHNOLOGY

moral dilemmas, using dialogue and relational skills (Puig, 1996; Petralanda, 2007a). The ethical component of both programs is at the core of every subject studied, so that the ethical dimension of science and technology is constructed jointly with scientific knowledge,² and from not only the students' external world, but also from the inner world of each student. This approach to ethics education has required, inevitably, that science classrooms become spaces open to dialogue and interactivity from a non-selfish-self perspective, rather than individualistic spaces to accumulate scientific knowledge from a selfish-self perspective.

The major ethical fundamentals of both programs are the Life and the Responsibility Principles (Jonas, 1995, 2000): the virtues of prudence and kindness, and two values called *Environmental Solidarity* and *Cognitive Elegance*. Both programs favor understanding the complexity of interdependence among the different expressions of life (both human and non-human), within the non-selfish-self perspective of being-a-person-careful-and-loving-with-the-world. Both programs promote specific moral options to protect life such as: respect for the self-realization of not only human but also more-than-human life, nonviolence, openness to new models of sustainable (rather than nature-exhaustive) development, preservation of the diversity and complexity of life, and interactive associations as a strategy to promote cooperative autonomy. Figure 1 shows a simplified diagram of the ethical and educational structure of the programs.

From the perspective of the ethics of principles, both programs refer to life as an epiphenomenon of the Life Principle, characterized by the continuous and spontaneous generation of biological and cultural diversity, both of which coevolved over time, shaping humankind and nature. Therefore, life is studied as a *bioculturoma* that includes different types of scientific and cultural con-

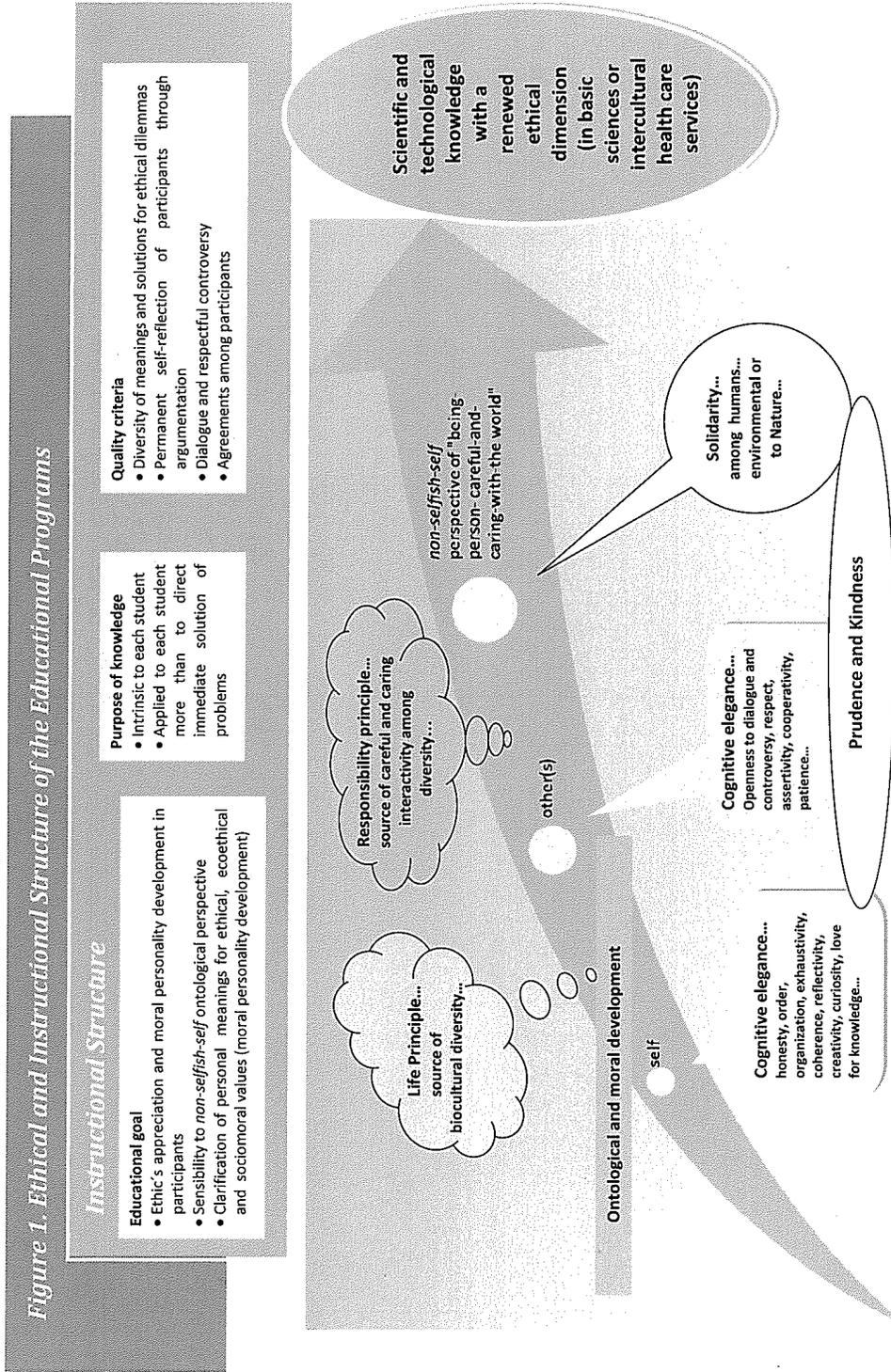
structs³ (i.e., nanoentities as genetic systems, macro entities as ecosystems and systems of ideas, metaentities as metapopulations, landscape, and culture.

From the perspective of the ethics of consequences, both programs include the Principle of Responsibility (Jonas, 1995) considered as a derivation of human power and commensurable with its magnitude, which must be pursued from a non-selfish-self perspective on different time scales:

[R]esponsibility with regard to the criteria of causality of the world, according to which the effects of our actions project into the near or far future, until they are fade away ... [means that] the moment of decision is no longer the one of the individual and [his or her] own short term action, but [rather] the moment of humankind in global and social action (Jonas, 2000: 323).

Virtues, particularly prudence and kindness, are considered human qualities acquired and strengthened as a result of certain attitudes and moral actions that could be developed through education (Puig, 1996; MacIntyre, 2001). Virtues are discussed in a broad multicultural and historical perspective showing the importance that humankind (including scientists) has assigned to them, since ancient times, in order to develop inner strength and character. Virtues are also considered essential to the development of the human ability to relate. Kindness is understood as *benevolence*, that is to say, as loving interest and concern for all expressions of life (Smith, 1997; John Paul II & Bartholomew I, 2002; Diez-Hochleitner & Ikeda, 2008) *prudence* is considered in the sense provided by Bilbao (2006):

[L]ike the art of the correct development of the continuous "deliberation-judg-



Petralanda, J. (2008) RENEWAL OF ECOLOGICAL ETHICS: Educational aspects from a multicultural approach to Human-Nature interactivity. TODA Conference 2008

RETHINKING EDUCATION AND TECHNOLOGY

ment-decision,” initiated at the intentional moment and culminated at the effective accomplishment moment ... cannot be interpreted like mediocrity, simple precaution without commitment, absence of decision or evasion of responsibilities ... because it is, in fact, the virtue of those who take the initiative, assume the risk, accept the responsibilities and confront the challenges (Bilbao, 2006: 207).

Both programs include *solidarity*—particularly *environmental solidarity*—and *cognitive elegance* as major values, both defined within the non-selfish-self ontological perspective described. Environmental solidarity, a fundamental value in ecoethics, especially within the program designed for science students, seeks to prevent the excessive anthropocentric centering of scientific research. Care is taken to present a sense of human solidarity, which makes possible the interdependent self-realization of humankind as well as the preservation of nature. It requires developing a prudent and kind willingness to be surprised by nature, as well as a trust in the innate human ability to transcend our own everyday realities and to become intelligent interpreters of the unknown language of nature.

In the case of the Intercultural Primary Health Care Services program, environmental solidarity is presented jointly with human solidarity among cultures and within an integral or holistic health perspective. Clarification and strengthening of the interpersonal and intercultural solidarity is a major educational goal of this program because it was evident from the beginning that the students’ preconception about the relationships between health care workers and patients was very different depending on their cultural background. Students from Amazonian Aboriginal cultures, regardless of gender, had a relational style based mainly

on proximity, love and respect for patients’ lifestyles, centered in the patient more than in the health care provider (Figure 2 A and C). Non-indigenous students, especially males, had a more distant relational style, strongly centered in the academic knowledge of the health care provider and with a lower level of respect for patients’ lifestyles (Figure 2B). This could be altered, towards a more caring style, as students advanced through the program (Figure 2D).

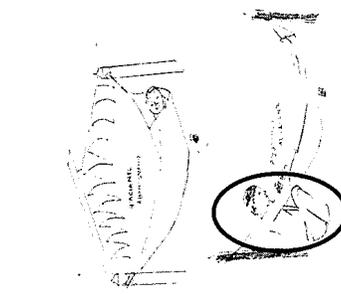
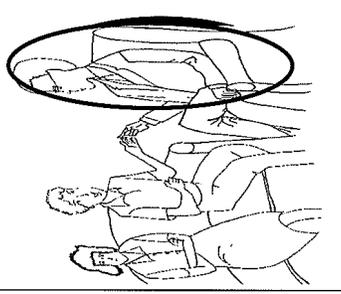
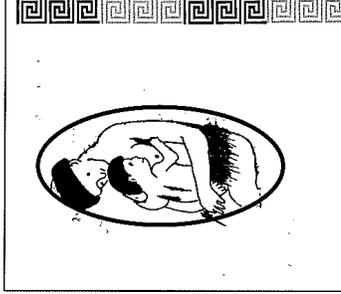
Regarding the value of *cognitive elegance*, it is defined as the combination of instrumental and ultimate values characteristic of cognitive and attitudinal competences that are needed to build scientific or technological knowledge. Values included within cognitive elegance were selected by students and faculty members of the Science Faculty, from a list of more than 70 characteristics considered valuable for scientists’ work (Petalanda, 2007a). Selected values include those specific to individual cognitive traits (i.e., order, organization, exhaustivity, coherence, reflectivity, creativity, curiosity, honesty, wisdom (as a love for knowledge)) and those specific to social traits directly linked to the human ability to relate (i.e., patience, cooperativeness, willingness to solve problems, openness to dialogue and controversy, and respect for self and other(s)).

The educational guidelines used to build these programs aim to contribute to the renewal of ethics, including ecoethics, providing ethical support to improve the human ability to relate. They are designed to promote human encounters with other humans and with Nature from a non-selfish-self perspective. They seek to generate joy and cooperative resistance to adversity promoting body, mind and soul well-being. These encounters require generosity and humility, to broaden the-self and to appreciate interdependence among different expressions of life.

Figure 2. Relational styles of Intercultural Public Health Services Program students

Answers to the question

“How would you relate to patients once you become an intercultural public health technician? Please explain and draw a picture indicating who you are in it”

<p>A. Yanomami male student</p> <p>“When the patient and I first encounter, I would hold to my ethical principles to guide my behavior towards him/her. Specially if he/she is a person that does not belong to my community. I treat the patient, that does not belong to my community, that it is not my family, same as if will by my family, because he/she has the right to know what affects his life, I would trust him/her, I would hold all my patience and care, in other words I would treat him as my family”.</p> 	<p>B. Non indigenous male student</p> <p>“As a future health promoter I would like to attend a sick person in such a way that there could be a respectful, open doctor/patient communication, with responsibility, loyalty and sensitivity. Same way to the relatives that are caring him/her, taking into account that they have the right to know the truth of what is happening to their sick relative”</p> 
<p>C. Yek'wana girl student</p> <p>“I would like to care a patient like to myself in such conditions. First I would let come to me to the patient and the relative accompanying him/her, because he/she not only has a disease but is also suffering and needs somebody care and friendship. I would like to care him/her as in my drawing”</p> 	<p>D. Non indigenous female student</p> <p>“There are not enough words to describe the manner I would like to care a sick person. In summary I would like that my patients feel like in my drawing when I would care them and study their sickness”</p> 

Petralanda, I. (2008) RENEWAL OF ECOLOGICAL ETHICS: Educational aspects from a multicultural approach to Human-Nature interactivity. TODA Conference 2008

RETHINKING EDUCATION AND TECHNOLOGY

Notes

1. English translations of quoted Spanish sources in this manuscript are made by the author.
2. Scientific knowledge is used here as humankind construction of representations searching to know, understand and transform reality (Echeverría, 1998).
3. We keep here the double notation to differentiate science as a collective *cultural* construct to which any scientist could contribute regardless of his/her cultural origin from other more particular cultural constructs.

References

- Aranguren, Jose Luis (1997). *Ética*. Madrid: Biblioteca Nueva.
- Benhabib, Seyla (2006). *El Ser y el Otro en la ética contemporánea*. Barcelona: Gedisa.
- Bilbao, Galo; Fuertes, Javier, Guibert, Jose María (2006). *Ética para ingenieros*. Bilbao: UNIJES-Desclée de Brouwer.
- Blaschke, Jorge (2007). *La rebelión de Gaia. La verdad sobre el cambio climático*. Bogotá: Robinbook.
- Bloom, Barry (1999). "The spread of depression: Public health trends." *International Herald Tribune*, Dec 3.
- Brown, David (2007). "Ethical Dimensions of Climate Change." *Proc Environmental Ethics Policy Conference*. Dublin: Royal Dublin Society.
- Callicot, John B.; Rozzi, Ricardo; Delgado, Luz; Monticino, Michael; Acevedo, Miguel; Harcombe, Paul (2007). "Biocomplexity and conservation of biodiversity hotspots: three case studies from the Americas." *Philosophical Transactions of the Royal Society* 362: 321-333.
- Cortina, Adela (1996). *Ética mínima*. Madrid: Tecnos.
- Diez-Hochleitner Ricardo & Ikeda Daisaku (2008). *A dialogue between East and West. Looking to a Human revolution*. London: I.B. Tauris.
- Dyson, Freeman (1994). *De Eros a Gaia*. Barcelona: Tusquets.
- Eguillor, María Isabel (1984). *Yopo, shamanes y hekura. Aspectos fenomenológicos del mundo sagrado Yanomami*. Puerto Ayacucho: Ed Salesiana.
- Eguillor, María Isabel, Petralanda, Izaskun, Heredia, Sissy, Moreno, Darío, Iglesias, Asunción (2005). "La educación en ciencia y tecnología en contextos multiculturales: Avances de una investigación didáctica para el desarrollo de contenidos." *Enseñanza de las Ciencias* VII (E).
- Echeverría, Javier (1998). *Filosofía de la ciencia*. Madrid: Akal.
- Etxeberria, Xabier (2005). *Temas básicos de ética*. Bilbao: Desclée de Brouwer.
- Fealy, Richard (2007). "Climate Change what does it mean?" *Proc Environmental Ethics Policy Conference*. Dublin: Roy Dublin Soc.
- Finkers, Juan (1991). "El Yanomami en contacto con su ambiente." *La Iglesia en Amazonas* XII(53), 40-45.
- Gabilondo, Angel (2001). *La vuelta del otro. Diferencia, identidad, alteridad*. Madrid: Trotta.
- Gilligan, Carol (1994). *La moral y la teoría: Psicología del desarrollo femenino*. Mexico: FCE.
- Gonzalez, Juliana (2001). *Ética y libertad*. Mexico: UNAM-FCE.
- Gutierrez Marcelo (1996). "Los Pemones." *Etnias Indígenas de Venezuela: Semilla primigenia de nuestra raza*. Caracas: San Pablo.
- Honneth, Axel (1997). *La lucha por el reconocimiento*. Barcelona: Grijalbo.
- Jonas, Hans (1995). *El principio responsabilidad: ensayo de una ética para la civilización tecnológica*. Barcelona: Herder.
- Jonas, Hans (2000). *El Principio Vida. Hacia una biología filosófica*. Madrid: Trotta.
- John Paul II; HH Bartolommeo II (2002). *Common declaration on environmental ethics*.
- Kwiatkowska, Teresa., Issa, J. (1998). *Los caminos de la ética ambiental*. México: Plaza Valdés.
- Lévinas, Emmanuel (1995). *Totalidad e infinito. Ensayo sobre la exterioridad*. Salamanca: Sígueme.
- Lovelock, John (1991). *Healing Gaia*. New York: Harmony Books.
- MacIntyre, Alisdair (2001). *Tras la virtud*. Barcelona: Crítica.
- Maslow, Abraham (1972). *El hombre autorrealizado*. Barcelona: Kairos.
- Morán, Emilio (2000). *La ecología humana de los pueblos de la Amazonia*. Mexico: FCE.
- Mosonyi, Esteban (2004). "Reflexiones en torno a la epistemología de la etnociencia." *En la ciencia* 14, 68-78.
- Motherway, Bryan (2007). "Sustainable Energy. The ethical aspects." *Proc Environmental Ethics Policy Conference*. Dublin: Royal Dublin Soc.
- Narbaiza, Iñigo (2004) "Consideraciones sobre el desarrollo sostenible en comunidades indígenas del estado Amazonas." *En la ciencia* 14, 124-134.
- Negrete, Plinio (2004). "Problemas epistemológicos de la racionalidad propia de la cultura andina precolombina." *Mem IV Foro Internacional sobre la espiritualidad de los Pueblos Indios de América*. México: Universidad de Michoacán.
- OMS (2002). *Indicadores de salud mundial*. Geneva: WHO.

RETHINKING EDUCATION AND TECHNOLOGY

- Oltvai, Zoltan & Barabasi, Albert-Laszló (2002). "Life's Complexity Pyramid." *Science* 298: 763-764.
- Petralanda, Izaskun (1993). "Reflexiones sobre la muerte del humanismo entre los nápes." *Mem CAICET III* (1-2), 29-38.
- Petralanda, Izaskun.; Salazar, Cruz; Ferreira, Carmen; Gil, Edgar; González, Gladys; Rodríguez, Antonio (2004). "La ética ecológica o ambiental: Situación actual y perspectivas." *Rev Fac Ingeniería* 19(3), 43-50.
- Petralanda, Izaskun (2005). "Relaciones entre la diversidad biológica y la diversidad cultural." *Mem I Simp Internacional sobre Pensamiento Andino (Visión estratégica del mundo actual)*. Ecuador: UNESCO.
- Petralanda, Izaskun; Salazar, Cruz; Ferreira, Carmen; Pereyra, Eugenia; Delgado, Laura; González, Zurima; Hernández, José; Matos, María; Salazar, María; Winckler, Moraima; Villarroel, Gustavo (2005). "Ética en la educación científica y tecnológica: Experiencia en la Facultad de Ciencias de la Universidad Central de Venezuela." *Enseñanza de las Ciencias VII* (E).
- Petralanda, Izaskun (2006). "Educación ética en la Facultad de Ciencias, UCV." *VI Seminario sobre Problemas Éticos en Venezuela: La dimensión ética de las ciencias y las tecnologías* Caracas: CEI-UCV.
- Petralanda, Izaskun (2007). "Ética y bioculturalidad: El reconocimiento del otro(a) en la salud." *Pontes Interculturais*. Brasil: Nova Harmonia.
- Petralanda, Izaskun (2007 a). "Ética en la educación científica y tecnológica en la Facultad de Ciencias de la UCV: El Principio Vida y la Elegancia cognitiva." *Revista Facultad de Humanidades y Educación*. Caracas: FHE-UCV.
- Petralanda, Izaskun; Eguillor, María Isabel; Iglesias, Asunción (2007a). "Ética y educación intercultural en ciencias y tecnologías: Capacitación de Técnicos Medios en Servicios Interculturales de Salud." *Revista Facultad de Humanidades y Educación*. Caracas: FHE-UCV.
- Pinillos, Marcela (2005). "La naturaleza histórica de la biodiversidad: Elementos conceptuales de una crisis." *Interciencia* 30(4), 235-242.
- Puig, Josep (1996). *Construcción de la personalidad moral*. Barcelona: Paidós.
- Rogers, Carl (1981). *La persona como centro*. Barcelona: Herder.
- Smith, Pauline (1997). *What are they saying about environmental ethics?* New York: Paulist Press.
- Sosa, Nicolàs (1998). "El qué y el para qué de una ética ecológica." *30 Reflexiones sobre educación ambiental*. Madrid: CENEAM.
- Speranza, Andrea (2006). *Ecología profunda y autorrealización. Introducción a la filosofía ecológica de Arne Naess*. Buenos Aires: Biblos.
- Trewavas, Anthony (2006). "A brief history of Systems Biology." *The Plant Cell* 18: 2420-2430.
- Uhuöttöja (1983). "1r Congreso Uhuöttöja." *Bol Antropológico* 7, 42-51.
- Westra, Laura (2008). *Environmental justice and the rights of indigenous peoples*. New York and London: Earthscan.
- Zambrano, María (2004). *Persona y democracia: la historia sacrificial*. Madrid: Siruela.