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Evolving Development: An evolutionary perspective on development for an interconnected world

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Introduction

This paper is the result of transdisciplinary inquiry among the authors, motivated by direct interest in the issue of development, *per se*, and in Mexico's development, in particular. Our inquiry departs from our various areas of expertise and experience, including: systems theory, general evolution theory, economic development, technology transfer, social innovation, sustainable development, environmental behavior, social systems design, and education.

The initial question with which our inquiry began was: "what is development?" Not economic development, social development, human development, or sustainable development… but simply, development. Why has it become necessary to qualify the term so inconsistently? What are the interconnections among these different conceptions of development? What implications arise from the application of the sciences of complexity to a cross-disciplinary analysis of developmental dynamics? These are the type of questions that have emerged from our collaborative inquiry.

The creation, management and evolution of the knowledge required for what we are calling *evolutionary development* is tremendously challenging. Unfortunately, all too often human beings have the hubris to think they already know all the answers to the challenges of change. This poses the educational challenge of creating systems that move from producing knowers to enabling lifelong learners. The relation between learning — and in particular social learning — and development is not a novel issue. Nevertheless, the evolutionary perspective offers new possibilities for the design of learning and knowledge systems as part of a more comprehensive development strategy.

The overall purpose of our research is practical: the articulation of an actionable model of development, conceived as an evolutionary praxis that integrates various disciplinary dimensions in the generation of informed policy planning and decision making to guide the direct and conscious involvement of citizens in the development of

their societies. The creation of such a model requires solid grounding in appropriate theory, philosophy, epistemology, and methodology, and clearly represents an ambitious and complex task. To be congruent with our assumptions, the values, and knowledge base upon which our research is based, our inquiry takes the form of a disciplined open ended and evolving conversation.

1. Development— an evolutionary perspective

1.1 A survey of approaches

The term *development* connotes an amelioration of current conditions, and as such, implies progress. In many instances, development is equated with growth or evolution. And yet, development is a term that relates more to the world of human affairs, and is part of our socially constructed reality in terms of what we consider to be "desirable" objectives for us or others — and hence allows us to make very subjective and relativistic statements about what and who is developed vs. those that are not. In this sense, it is not to be confounded with growth. *Growth* is something that we can measure through definable units of size or scale and relates to notions of physical size or numerical quantity. It provides a metric that can be applied to many processes of change, but not to those that are qualitative or conditional in nature. While distinct from each other, both growth and development are not to be confused with evolution. *Evolution***,** as we will see in more detail, involves a process of directional (but non-directed) change that leads from states closer to thermodynamic and chemical equilibrium to those further removed from it. More simply put, it is "a general way of conceptualizing the self-organizing selection process of the universe displayed in … increasing complexity" (Reeves, 1992, 1102). In summary,

Growth = an increase in size or quantity
Development = an amelioration of conditions or quality
Evolution = a tendency toward states further removed from thermodynamic and chemical equilibrium

Most definitions of development are related to the concept of welfare and have direct linkages to economic dynamics. For instance, the meaning of development is often biased to "economic development" (Meier, 1970) and equated to industrialization. Authors such as Mathur (1999) correlate economic development with change in employment and self-sustained capital income, which implies growth in per capita income as well as wealth and population movements. The Economic Development Council (UN, 1987) defines the term as the process of creating wealth through the use of all kinds of resources. Yet, these are limiting definitions of development because they restrict its causes to variables such as capital accumulation .

To answer the question of why the distance between developed and less developed countries persists, theoretical approaches have been formulated using empirical instruments such as annual rate of growth and per capita income. Used as yardsticks, these approaches tended to reduce human well-being to numerical measures.

Economic models were designed to provide a fast track to change economic conditions. Models based on the Marxist scheme or on orthodox liberal theory assume preconditions on which development depends. Most of the models imply rigorous

abstraction, simplification and quantification to analyze and to evaluate framework conditions. In general, these theories assume that there exists a set of economic variables that can be stimulated to promote growth, while all the other social conditions, such as legal framework, cultural context and natural environment, to mention but a few, are excluded from the models. Usually, the experience of developed countries was taken as the starting point of these models, assuming that similar conditions could exist in less developed countries.

In addition, a sole factor is frequently defined as the key to promote development as in the neoclassical theory of economic growth, as proposed by Solow (in Meier, 1970), where aggregate output of a country is a function of labor, capital, and exogenously given technology. In this approach, the main focus is the market mechanism and responses to differences in prices for inputs such as capital, labor, energy, raw materials and information. Variables such as knowledge, skills, competencies, and the role of innovation are seen as exogenous, thus putting them out of critical influence in the process of development. One main characteristic of the orthodox models is the concern for how to increase production with little attention to distribution. The Nurkse model tried to establish the relationship between the lack of capital accumulation and the lack of efficient means to distribute wealth by postulating a vicious circle of poverty seen as inhibiting the capacity of poor people to save, and thereby reducing capital accumulation.

One of the main ideas addressed by Myrdal's (1968) economic development model was that governments should promote equal distribution of income in order to increase output and overcome underdevelopment, asserting that this can be accomplished through economic planning. But even though Myrdal recognized the necessity of social justice in parallel with raising levels of production, the main focus remained on ways of promoting economic variables. Theories about economic stages of development started with the Rostow's (1960) model based on national developmental stages. This emphasized the approach of earlier economists, like Adam Smith (Kaldor, 1961), regarding the different steps that a country has to take before to reaching a higher stage of welfare. Rostow contemplated five stages of economic growth: the traditional society; the preconditions for take off; take off: the drive to maturity; and the age of high mass consumption. The line that separates these stages is the existence of a pre-Newtonian science and technology and the promotion of economic factors that mark the dominance of Newton science. Therefore, according to Rostow, economic development is based on the ability to create an advanced economic society.

Prior to the introduction of Rostow's stage-based approach, the concept of developmental cycles had been developed by Joseph Schumpeter (Harris, 1960). He constructed a theoretical system to explain business cycles and capitalist economic development. According to Schumpeter's model, the key factor in economic change is the introduction of innovation, defined as changes in the methods of supplying commodities. Here, the entrepreneur plays a central role in development, serving as the main actor who seeks profits through innovation. In this way, economic development results from the dynamic process motored by economic fluctuations that reflect the process of adaptation to innovation.

The main principles described above were applied during more than seventy years of the twenty century. Later, developing countries reached high levels of economic growth even though these were characterized by high levels of income inequalities.

In recent years a growing interest has been developing around the implications of the human factor as a central issue in economic development. Starting with Backer's (Meier, 1970) work, human capital has become another investment element on the road to economic development. Through his model of the US economy, Schultz (1961) considers that, to some extent, the successful growth of America until 1960 can be explained by the high productivity of labor. Later, Lucas (Todaro, 1992) uses the interaction between the productivity of human capital and other resources to explain the growth rate in regions with human capital accumulation. From here, the concept of the *learning regions* has gained popularity, reinforced by the success of areas such as Silicon Valley in California and Route 128 outside of Boston. Learning regions theory (LRT) is concern with those intangible factors of intellectual capital that make a region economically dynamic and competitive. It focuses on concepts such as the nature of innovation and the conditions that enhance it. These regions are characterized by the presence of a highly educated workforce, universities, and very creative and entrepreneurial people. According to LRT, the main cause of development is the social interaction among the agents that promote innovation and technological change. So according to LRT, economic development depends on the capability of the system to accumulate knowledge, know how, and skills.

Schumpeter's model was taken as a theoretical reference in our search for a framework for these innovation-related concepts. . Notions such as dynamic change and progress were adopted to integrate the so called evolutionary economic theory based to some extent on a biological evolutionary analogy (in the sense that a system has to transform and transcend itself in order to reach a higher stage of development). In this theory, economic development is based on a notion of continuous change where different forces combine to build a dynamic network of interactions. Economic agents behave in a systemic field in a way that explicates the fact that every member of a society has a roll to play. It does so by surfacing the processes by which energy sources maintain the functional and operational viability of the system through the generation and transmission of knowledge.

In recent years, it has become imperative to gain a better understanding of the developmental pathways open to constructive human progress. Specifically, it must be recognized that innovation takes place within existing economic and cultural frameworks, and so must integrate with established norms and interact with embedded values to stimulate effective social change with minimum cultural upheaval.

In order to obtain a clearer image of development, it is essential to adopt a new orientation. In his speech to the 131st session of the UNESCO Executive Board in Paris, Federico Mayor expressed the need for such a change in mentality as follows:

> The new concept of development takes account not only of economic growth but also of all those parameters that reflect the quality of life, full enjoyment of creative capacity and observance of human rights, which the principal decision-makers should take into account so that development is not owned and dispensed by a few but is a common undertaking on an international, multilateral scale, with the human being as its centre *[sic.],* its sole agent and its beneficiary. *All that is needed is a new look at the world, and different premises.* [emphasis added.]

1.2 The challenge to Mexico

As a developing country Mexico has looked for an effective economic strategy in the last four decades. Several ups and downs have characterized the Mexican economy ever since 1940, when, as a result of World War II, Mexico had the opportunity to participate strongly in the broader US economy. Most fashionable economic theories have been applied in Mexico — from import substitution strategies to strong neoliberalism. After 50 years of neoclassical theories, the gross domestic product has witnessed a twenty-fold increase, but per capita income has only quadrupled. During this time, the total population has passed from 50 million to almost 100 million inhabitants and the labor force increased from 5 to 34 million workers (CONAPO, 2001).

Even though life expectancy has increased from 46 to 72 years, and the illiteracy rate has diminished to 10% of the total population, more than 6 million Mexicans are illiterate. Today, 2 million children do not have access to schooling and 40% of those who do attend school eventually drop-out with out obtaining their high school degree. Naturally, poverty is one of the main concerns of Mexican government given that 14 million people in this country cannot fulfill their basic human needs because they live in communities without proper housing or public infrastructure.

Income inequality is a strong characteristic of Mexican society, made evident by large low income groups and small high income groups. As Federic Mayor exhorted, conditions such as these call for a radically new approach to development – one that educates and empowers people to improve their own quality of life and contributes to the betterment of their communities. The design and coordination of a national system of innovation could present a viable path toward evolutionary development for this country, especially given that at least three of the ten regions of Mexico could serve as the motor of innovative national economic activity. These regions comprise the central area— where the capital is located (with more than 15 million inhabitants); the northern part — with the city of Monterrey as its axis of regional development; and the southern part — where major oil reserves are located. Important human capital accumulation and creative entrepreneurs exist in all three regions.

In Mexico, as well as in other developing countries, new developmental paths need to be devised in order to respond to the new global realities. The path toward greater industrialization, further commercialization, and more materialism has proven to be unsustainable and meaningless. Development needs to promote increases in quality of life, measured by the presence of a holistic sense of individual and collective wellbeing, rather than increases in standards of living, measures by the accumulation external material possessions and accomplishments that may or may not contribute to sustainability and the fulfillment of human potential . The new framework for development initiatives traces its roots to recent developments in general evolution theory.

2. Foundations of evolutionary development

2.1 Theory: The emerging evolutionary paradigm

For most people, evolution simply means Darwin. Unmistakably, he is important as a historical figure who legitimized a theory of evolution both scientifically and popularly. However, scientific understanding has advanced beyond even neo-Darwinian

interpretations, and yet popular conceptions of evolution remain strongly associated with classical Darwinism.

Classical Darwinism sees evolution as a process of trial and error; something like the work of a blind watchmaker. "A series of random genetic mutations is not likely to have produced all the complex species indicated by observation and the fossil record within the time that was available for biological evolution on this planet. … In any case, if random mutation and natural selection require more time to produce viable species than the fossil record indicates, then Darwin's theory, if not quite mistaken, is at least incomplete" (E. Laszlo, 2000).

In recent years, an action-oriented systems approach to the development of human and natural systems has emerged from the study of evolutionary processes in nature and society. It is known as General Evolutionary Systems Theory (or General Evolution Theory (GET), for short). It postulates that the evolutionary trend in the universe constitutes a 'cosmic process' specified by a fundamental universal flow toward ever increasing *complexity*. It is now understood that this dynamic of complexification manifests itself through particular events and sequences of events that are not limited to the domain of biological phenomenon but extend to include *all* aspects of change in open dynamic systems with a throughput of information and energy. In other words, evolution relates to the formation of stars from atoms, of *Homo sapiens* from the anthropoid apes, as much as to the formation of complex societies from rudimentary social systems.

The promise of general evolution theory is captured succinctly by Ervin Laszlo, Ignazio Masulli, Robert Artigiani, and Vilmos Csányi as follows:

> General evolution theory … can convey a sound understanding of the laws and dynamics that govern the evolution of complex systems in the various realms of investigation. ... The basic notions of this new discipline can be developed to give an adequate account of the dynamical evolution of human societies as well. Such an account could furnish the basis of a system of knowledge better able to orient human beings and societies in their rapidly changing milieu. (Laszlo, Masulli, Artigiani, & Csányi, 1993, xvii, xix)

By applying GET to societal phenomena, human social systems can be understood to evolve through a process of convergence to progressively higher organizational levels. When flows of people, information, energy, and goods intensify, they transcend the formal boundaries of the social system. Thus neighboring tribes and villages converge into ethnic communities or integrated states, these in turn become the colonies, provinces, states, cantons, or regions of larger empires and eventually of nation-states. Today, we are witnessing yet a further level of convergence and integration as nation-states are joining together in the creation of various regional and functional economic and political communities and blocs, in Europe as well as in North America and elsewhere in the world.

Through the notion of 'bifurcations' (nonlinear and often indeterminate transitions between system states), General Evolution Theory can be applied to conditions that prevail when societies are destabilized in their particular time and place. Societal bifurcations can be smooth and continuous, explosive and catastrophic, or abrupt and entirely unforeseen. However, they always describe the point at which a social system

traverses a period of indeterminacy by exploring and selecting alternative responses to destabilizing perturbations. Bifurcations are revolutionary transformations in the development of society. The reins of power change hands, systems of law and order are overthrown, and new movements and ideas surface and gain momentum. When order is re-established, the chaos of transformation gives way to a new era of comparative stability. GET explains how bifurcating societies either reorganize their structures to establish a new dynamic regime that can cope with the original perturbations, or desegregate to their individually stable components.

GET provides a conceptual foundation for evolutionary development. It suggests that human destiny can be placed in human hands, since it points to the possibility of moving toward the conscious creation of evolutionary strategies by which to guide the sustainable development of our societies.

We have much to learn from nature with regard to self-organization and evolutionary governance, among other things. As Augros and Stanciu (1987, p. 231) point out, "her attributes of simplicity, economy, beauty, purpose, and harmony make her a model for ethics and politics." This model is one with which our species would do well to acquaint itself... It involves learning or re-learning what it means to be part of a natural community. Fritjof Capra (1996, p. 4) points to this as "the greatest challenge of our time: to create sustainable communities — that is to say, social and cultural environments in which we can satisfy our needs and aspirations without diminishing the chances of future generations."

The extent to which we inform our actions through a transdisciplinary, universally relevant theory of evolution will mark the extent to which the consequences of our actions and the implications of our thoughts will contribute to developmental pathways that are either more or less sustainable. Mihalyi Csikszentmihalyi (1993) put it quite plainly: "In order to make choices that will lead to a better future, it helps to be aware of the forces at work in evolution."

The emerging evolutionary paradigm brings with it a new sense of human possibilities – and responsibilities. It "carries with it a psychic-spiritual dimension as well as a physical-materialistic dimension. Otherwise, human consciousness emerges out of nowhere... an addendum [with] no real place in the story of the universe" (Berry, 1990).

2.2 Philosophy: The sustainable living systems perspective

In 1987, the UN Environment and Development World Commission published the report "Our Common Future" in which the term Sustainable Development was defined as development that could serve the needs of present generations without jeopardizing of the needs of future generations. The notion of sustainable development is, within an evolutionary perspective, a step in the right direction. Much of what has been said about sustainable development draws on wisdom from ancient and contemporary indigenous civilizations that have demonstrated the possibility of living in balance with nature (e.g., the Kogi Indians of Colombia).

Assessing the global situation, we find that there is a whole spectrum of stages of sustainability. and that these stages correlate with stages of economic development. Western European countries, the US, and Canada, for example, have in place more effective environmental policies and practices than less developed countries like Mexico

and the rest of Latin America. Does this implies that "environmental protection is a 'luxury' which only wealthy societies can afford" (Wescott II, 1995)? Or is the issue more complex and actually linked to a root such as educational levels and the way peoples from different cultures perceive nature and their relation to it?

A fundamental shift in ways of thinking and forms of valuing is required in order to respond to the challenges of evolutionary development. Systems thinking and the sciences of complexity from a transdisciplinary base that places emphasis on the dynamic and nonlinear patterns of relationships required both to understand and to live in evolutionary ways. We need to reconnect with nature and to create a partnership with planet earth. The possibilities for evolutionary development and for the emergence of sustainable cultures are unlimited. In the words of Thomas Berry (1990, p. 123), "we are just beginning to explore what it means to be part of a universe that is alive."

Biomimicry has been defined by Janine Benyus (1997) as innovation inspired in living systems processes. She explains that "what is consistent with life is sustainable." For instance, in nature there is no waste. All the byproducts of one living system are nutrients for another. Why should industrial systems be different? Can we create an economy that follows the principles of competition *and* collaboration so manifest in living ecosystems? The knowledge derived from complex and evolving living systems may catalyze the next industrial revolution and facilitate the emergence of a sustainable age (Senge *et al.,* 2001).

The classical – and mistaken – image of nature as a drama of ruthless competition in a violent struggle for survival and domination has been replaced by the most recent understanding of complex evolving natural systems. Biologist Lewis Thomas expresses his views on the cooperative dynamics of animals and plants as follows:

> One major question needing to be examined is the general attitude of nature. A century ago there was a consensus about this; nature was 'red in tooth and claw,' evolution was a record of open warfare among competing species, the fittest were the strongest aggressors, and so forth. Now it begins to look different. ... The urge to form partnerships, to link up in collaborative arrangements, is perhaps the oldest, strongest, and most fundamental force in nature. There are no solitary, free-living creatures, every form of life is dependent on other forms. (Thomas, 1980, 1.)

The pattern of association and interdependence found in nature forms a type of relationship that, in the words of Lynn Margulis, "is far more than the sum of its parts" (Margulis, 1981, 167). What emerges can be called community.

In nature, community means that "every species ... directly or indirectly, supplies essential materials or services to one or more of its associates" (Dice, 1962, 290). Such a conception of community brings with it deeper insights, such as "... the notion of life as self-directed movement. Nature is not at war, one organism with another. Nature is an alliance founded on cooperation" (Augros & Stanciu, 1987, 129).

Community in nature occurs on many different scales and scopes. Just as we may think of the populations of various species living in a given geographic area within a broader biotic ecosystem as forming a community, so can we think of an organism itself as a

highly integrated, differentiated, and coordinated form of community. Of course, this means that there are myriad levels of community from the individual organism up to the community of life on this planet, all nested as sub- and supra-communities of each other.

Evolutionary development implies normative considerations. The norm, however, is nature, not idiosyncratic human proclivity. It is our challenge to foment individual and collective developmental processes that manifest evolutionary consonance. An action-oriented theory of evolution suggests that human beings have the choice consciously to participate in the creation of the future. And yet it seeks neither to predict nor to 'socially engineer' the future. Rather, it aims to create the conditions for the emergence of sustainable evolutionary futures. The evolutionary development approach is bottom-up, and as such, it faithfully replicates the strategy of natural evolutionary development in the chemical, physical, biological, societal, and possibly even transpersonal realms.

2.3 Epistemology: Knowledge and evolutionary learning

Exponential growth in the field of knowledge management, and its implications for the increasingly global knowledge economy, is a new reality that needs to be fully incorporated in any model of development. Not only is knowledge production increasing, the rate of knowledge production is itself increasing and accelerating. However, questions of what kind of knowledge is appropriate to evolutionary development, who should be involved in its creation, and how it should be created, managed and positioned to evolve are as yet infrequently considered in developmental concerns.

When a person becomes part of a social system, much of the knowledge required to carry out his / her functions has to be picked up and learned progressively in day-to-day interactions, as well through educational processes devised to transmit cultural values and practices. However, history shows that neither is there sufficient learning from past experiences, nor efficient preservation of vital knowledge from the present, for societies to evolve purposefully. This implies new challenges for both societal learning and knowledge management.

McElroy (2000) describes two generations of knowledge management (KM), which although focused primarily at the organizational level, have important implications for socio-cultural systems. First generation KM focuses on knowledge sharing – how to distribute existing organizational knowledge, usually through technology – while second generation KM focuses on knowledge creation – how to satisfy needs for new knowledge, usually through processes of learning and innovation.

Knowledge is a product of human reflection and experience. Given that it is context dependent , knowledge is a resource that can be found in an individual or a collective, or embedded in a routine or process. Since knowledge can be either explicit and tacit, it can be embodied in language, stories, rules, and tools, and results in an increased capacity for decision making and action to achieve some purpose (Wong & Radcliffe, 2000). . Explicit knowledge can be clearly articulated, communicated in formal and systematic languages or codes, and set down in written documents (Nonaka, 1994). Tacit knowledge is demonstrated through actions, embodied in personal experiences,

and is difficult to transfer (Polanyi, 1966). Both kinds are essential for evolutionary development.

De Long and Fahey (2000) distinguish between human knowledge, social knowledge, and structured knowledge. Human knowledge is both explicit and tacit — it is what individuals know (cognitively) or know how to do (procedurally and kinesthetically). Social knowledge exists in relations among individuals and groups. It comprises synergetic knowledge, is largely tacit, and is the result of working and learning together. Lastly, structured knowledge is embedded in the processes and infrastructure of a social system. Knowledge in this form is explicit and rule-based; it exists independently of human knowers and represents an organizational resource.

Evolutionary development requires effective knowledge management. In addition to tacit and implicit, human, social and structural knowledge, evolutionary development needs to respond to *what*, *how*, and *why* type questions. All too frequently education and knowledge management processes are focused exclusively on the transmission of information, rather than on the development of skills and, most importantly, the creation of the conditions for understanding and wisdom. *Why* type questions involve value judgments, and as such, cannot be answered in correct or incorrect ways but only with responses that are more or less useful and appropriate. This level represents the foremost challenge for evolutionary development since traditional teaching approaches flounder at these levels. Evolutionary development calls for self-directed learning that is active, participatory, and collaborative.

Although necessary, it is not sufficient to learn exclusively from the past. We must invent the future into existence also through our dreams of what should be. Evolutionary development demands the innovation of new ways of learning, doing, and living. Banathy (1996, p. 318-319) differentiates between maintenance and evolutionary learning. The first is adaptive. It involves the acquisition of fixed viewpoints, methods, and rules for dealing with known and recurring events. It maintains the *status quo,* and is appropriate during periods of socio-cultural stability. By contrast, evolutionary learning is innovative. It enables the learner to cope with uncertainty and change, renew perspectives and creatively design co-evolutionary human systems. It represents a more appropriate learning strategy during societal bifurcation points. By and large, contemporary educational systems are focused primarily on maintenance learning and the creation of 'knowers' — that is, people who know a lot about an existing field or area of specialization. But new realities and global challenges call for evolutionary learning and the empowerment of 'learners' — that is, people capable of generating new knowledge and processes as appropriate responses to changing socio-cultural and bio-physical environments. Evidently, knowledge is an essential by-product of learning, and evolutionary learning, an essential component of evolutionary development.

2.4 Methodology: Evolutionary systems design

As a species, our actions and interventions on this planet have been largely driven by chance and, at best, '20/20 hindsight.' However, as Margaret Mead once noted, we are at a point where for the first time in human history, we are able to explain what is happening while it is happening (in Montuori, 1989, 27). Evolutionary Systems Design

(ESD), as a meta-methodological approach to evolutionary development, builds on this relatively new meta-reflective competence. It serves as an instrument for evolutionary development by suggesting that our species can stop drifting upon the currents of change and begin to adjust its sails in view of sustainable evolutionary futures by capitalizing on the new understanding of evolutionary dynamics and effective approaches to the participatory design of social systems.

ESD is a humanistically oriented systems approach that facilitates the critical application of various systems perspectives to real-world situations (Laszlo & Krippner, 1998, 59). ESD draws on Social Systems Design, General Evolution Theory, and lifelong evolutionary learning orientations (Banathy, 1996; Laszlo, 1996). Communities that face practical challenges for socio-ecological development must learn to move "toward what will work to provide answers where no reliable guides exist." (Salner, 1996). By empowering evolutionary change agents neither as activists nor as theorists, but as a synthesis of the two, ESD offers a way — an integral path — for evolutionary development.

Essentially, ESD is a participatory process that seeks to empower people for their engagement in the development of their communities. The operational framework of ESD guides the development of the competencies necessary for a praxis focused on evolutionary development. This framework consists of four stages which are as follows (Laszlo & Laszlo, 2000):

1) *Evolutionary consciousness:* The creation of an awareness of the evolutionary history, of the changing conditions of change, and of the challenges that sustainable human co-habitation with life on Earth entails.
2) *Evolutionary literacy:* The development of a basic scientific understanding (grounded in systems thinking and the sciences of complexity) and an empathetic appreciation of the challenges facing humanity that is both personally significant and societally attuned.
3) *Evolutionary competence:* The gaining of a sense of responsibility that is coupled with the change management competence of respons**a**bility so that we can affect purposeful, positive, evolutionary change in the communities within which we work, play, and learn.
4) *Evolutionary praxis:* The understanding of how to become catalysts for change by learning what modes, methods, and means are best for clearly articulating and effectively communicating to others the need and means for change.

It is this last stage which completes the empowerment of individuals to participate in and facilitate evolutionary development. As indicated in this paper, evolution is a process of emergence — create the right conditions and interesting things happen. That is also the essence of ESD. The best we can do is get involved in the process of fostering the conditions under which sustainable evolutionary development can occur.

Evolutionary development processes must be able to provide ways of "doing more with less" — by increasing the abilities of individuals to resourcefully adapt with their environments in ways that change as their environment changes — but that remain constant in their maintenance of viable environments in which to operate. In order for this concept of evolutionary development to be in service to humanity, it must assure that both the products and the processes of change are:

5) Socially desirable

6) Culturally acceptable
7) Psychologically nurturing
8) Economically sustainable
9) Technologically feasible
10) Operationally viable
11) Environmentally friendly
12) Generationally sensitive
13) Capable of continuous learning

By monitoring all these aspects simultaneously, a process of development (individual, societal, or global) can be said to be evolutionarily if it involves a co-adaptive strategy that ensures the continual maintenance of an increasingly robust and supportive environment. This is the very essence of evolutionary development. Sustainable strategies must seek to identify opportunities for increasing the dynamic stability and self-sufficiency of individuals and groups in interaction with the broader set of components of its particular time and place. These strategies should always indicate areas of evolutionary potential to be developed to the advantage of the complex dynamic systems involved in ecosystemic interaction, now and into the future.

Final reflection

The design of strategies that promote evolutionary development is a human activity, and as such, will always be the result of particular Weltanschauungen. Most of the well intentioned development efforts that account for much of the "progress" achieved in the past, both in developed and developing countries, are responsible for major environmental damage and the widening of the gap between rich and poor on a global basis. Our inquiry into evolutionary development seeks both to make explicit and to embrace the values, perspectives, assumptions, and knowledge required to move human societal systems to a social innovation phase – that is, one at which the revitalization and generation of social systems appropriate for a sustainable global society becomes possible. How is it possible to make development locally relevant and globally attuned? How can evolutionary development promote higher quality of life — not just higher standards of living? How can our species learn to live simply, meaningfully, and yet productively? These are the true, as yet unaddressed, challenges of development, and they are the ones to which our inquiry is dedicated.

Sustainability is a rich source of innovation. While developed countries face the challenge of transforming their industrial and economic systems to meet the challenges of sustainability, developing countries like Mexico have the opportunity, instead of trying to catch up with the more industrialized nations, to devise systems of learning and innovation that can help 'leap frog' to a more advanced stage of evolutionary development. Doing more with less, increasing quality of life instead of standards of living, and creating a sustainable economy where present and future human needs can be met without compromising the natural environment — these are some of the concrete steps that any society interested in moving toward an evolutionary stage can take right now. Through further research on the issues set forth in this paper, we trust that the paths toward evolutionary development, through concrete and practical steps toward a praxis of sustainability, can be brought to light, clarified, and set forth as

elements of an evolutionary guidance system for the ongoing self-organization of our species together with the other species with which we share this wonderful planet and in harmony with the life support systems up which it all depends.

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