The Challenge of Walking Without a Road Map, Yet Finding One's Way

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The Idea of a Learning Society

A learning society cannot be built. It grows. It evolves. The conditions that foster the evolutionary process are, like for any other such process, multiple and diverse. In a learning society learning occurs everywhere. It pervades all aspects of life. It is not restricted to individuals but also extends to groups of people. Groups of people can learn, not just in the sense that the different individuals who are part of the group learn, but in the sense that the group as a whole behaves in a way that shows that it, as a group, learns. Further on in this article I shall use the term 'learning entity' to designate anything that learns, whether an individual or a socially organized group of people. So, some learning entities are individual people, others are small groups of people, such as families, yet others may be very large and complex, such as a city or a network of people – which may span the entire globe – involved in trying to tackle a particular problem or respond to a specific opportunity. Larger learning entities may, in fact, be made up of smaller ones, and those smaller ones may be made up of yet smaller ones, down to the level of individual people.

All those learning entities are in different ways interconnected. The boundaries between them are not rigid. Many things get exchanged between them, including what they know and their capabilities to respond to the things that constantly change around them. Learning thus manifests itself at different levels of social organization, ranging from the individual to society at large. It is by nature something of which the overall behavior is, in a complex way, dependent on the interactions of the different entities that constitute the whole. In my view it is important to understand learning in the complex way I have just indicated. Because this is not entirely easy, and may even look somewhat abstract, I shall explain a couple of key terms used in the above paragraphs – particularly the notions '*learning*', '*complex*', '*entity*', and "*whole*," – in more detail.

Learning

There is much confusion about learning. For many people the word is closely, if not exclusively, related to what goes on in the school or similar planned instructional settings. In the perception of many people, learning also has to do predominantly with acquiring some skill or a specific pattern of behavior, or with getting acquainted with particular pieces of knowledge. So, one learns to swim; ride a bicycle; read and write in the mother tongue; speak a foreign language; become well-behaved according to the prevailing norms; and interpret one's environment and the operations that occur in it (e.g. commercial ones) in quantitative terms and relate them mathematically. Such things are useful and often even essential in today's world. Yet, this is not all there is to say about learning. A learning society is not simply a society in which everyone is able to take courses, attend educational institutions, or acquire the skills one likes.

> **LEARNING UNDEFINED**
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> "*Human learning is the <u>disposition</u> of <u>human beings</u>, <u>and</u> of the <u>social entities</u> to which they pertain, to engage in continuous <u>dialogue</u> with the human, social, biological and physical environment, so as to generate intelligent behavior to <u>interact constructively with change</u>.*"
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> From: Visser (2001). (Emphasis added.)

Another misconception about learning is that its most important dimension relates to what happens inside us, particularly what happens inside the brain and more specifically the neocortex. Some of the excitement about the recent findings in the field of neuroscience seems to contribute to such a bias in our thinking. No doubt, our brains are important, but they are not the only part of our bodies that gets engaged when we learn. School-based pedagogical practices often assume that what is really important about human beings is not the integrity of their selves, but rather the superiority of those parts of their nervous system that came last in the evolution[2]. If such practices still have some success, then it is despite this emphasis and not because of it. It is particularly frightening to see how such a narrow view of learning almost totally separates the concern with people's reasoning power from their emotions.

In several publications (e.g. J. Visser, 2000; J. Visser, 2001), I have referred to learning as a disposition, more specifically, as a disposition to dialogue.[3] That dialogue is the essential means through which we become an integrated part of everything that surrounds us, through which we are able to recognize our place in the universe. Unlike other life forms, humans have a highly developed capability of consciousness. They do not merely act and react to what happens around them, they also observe themselves doing so – leading them to reflect on what they do and on its consequences, pondering questions it raises in them. The reductionist tendency in the tradition of disciplined inquiry has largely ignored investigating such a complex phenomenon as consciousness. I believe it is necessary to correct this and to bring to bear on this area emerging insights into the validity and relevance of transdisciplinary approaches, expressed, among other fields, in the study of complexity.

Complexity

Like in the case of learning, there is also quite some confusion surrounding the term complexity. This is partly caused by the difficulty of the concept itself. We use the word 'complex' in everyday language and think we have a fair idea of what it means. The idea we have of it is indeed probably sufficient for our everyday communication about situations we perceive as complex. There are similar problems with such concepts as 'heat' and 'energy.' These, too, are everyday words with everyday meanings that create a lot of confusion when one starts to deal with those same notions in the context of the physical sciences. The literature that popularizes concepts such as complexity can do a lot of good in enhancing understanding. Sometimes, however, such literature ends up in the hands of sloppy readers. In such cases no great harm occurs as long as those readers are not at the same time authors.[4]

> "*For us . . .complexity indicates that the system consists of parts which interact in ways that heavily influence the probabilities of later events. Complexity often results in features, called* **emergent properties**, *which are properties of the system that the separate parts do not have.*"
> From: Axelrod and Cohen (1999, p. 15)

The scope of this article does not allow exploring the issue of complexity in great depth. I refer to other sources[5] for such an exploration. What matters here, for the discussion of the learning society as a complex adaptive system, is the distinction between randomness and complexity. Gell-Mann (1994) argues that the way in which complex adaptive systems – and for that matter we, as individuals, and the various communal and societal frameworks we generate – learn and evolve, requires, among other things, "the ability to distinguish, to some extent, the random from the regular" (p. 50). To understand this better, consider that a learning society is typically made up of all kinds of complex subsystems (human individuals represent but one level of such subsystems). All those subsystems are themselves complex adaptive systems in their own right. They interact with each other and interpret each other in terms of what is regular in them and what is random. A very simple example is when an infant first discovers that a particular action on her part, for instance smiling or crying, results in non-random behavior on the part of particular people (parents and siblings) in her environment. Not only does the infant establish that there is regularity in how certain causes are linked to effects, it also starts distinguishing different kinds of people in the process. Some people are indifferent and respond in all manner of different ways; others, though, respond distinctly and in a regular, more or less predictable, fashion.

At the level of the above example, regularities can still be relatively easily described. However, most patterns of interaction that humans develop are much more difficult to describe, both from the perspective of the learning entity and from the perspective of the environment with which that entity interacts. At the heart of the issue of effective complexity is, according to Gell-Mann (1994), the difficulty to describe "the regularities of a system by a complex adaptive system that is observing it" (p. 50). Or, as Axelrod and Cohen (1999) emphasize with reference to Gell-Mann's position: "A system should be called complex when it is hard to predict not because it is random but rather because the regularities it does have cannot be briefly described" (p. 16).

The recognition that we, as humans, are complex adaptive systems among many other such systems – each of them exploring randomness and regularity among all the others with which they interact – is reason to be modest. It shows our own importance as relative to our environment. It gives us a sense that what we are, what we seem to know, is as much a function of our capacity to undertake these explorations in the random and the regular as that it depends on the affordances of the environment of complex adaptive systems that surrounds us and of which we become part through our interactions with it.

The above notion challenges our ability to understand the world in ways that we have grown used to thanks to centuries of scientific inquiry that was based on taking the world apart, looking at and understanding some of its detail, but never being able to take account of phenomena that emerge when things are put together again and the whole becomes more than the collection of its isolated parts. A crucial aspect of complex adaptive systems is that they are composed of entities, usually called agents, which interact with each other. The system is not complex because there are *many* such agents in it. Rather, its complexity has to do with the nature of interactivity in the system as a whole. That interactivity is such that "current events heavily influence the probabilities of *many kinds of later* events" (Axelrod & Cohen, 1999, p. 7, my emphasis). This allows properties of the system as a whole to emerge that cannot be explained in a simple manner on the basis of its constituting entities considered in isolation.

Entities and Wholes
I take the terms "entity" and "whole" deliberately together, because they belong together. We cannot speak of a part, an entity, without implying that there is a whole. Similarly, it makes no sense to introduce the concept 'whole' without, at the same time defining it in relation to its constituting parts. As mentioned before, complex adaptive systems are often made up of smaller complex adaptive systems (aggregates of agents, or, as Holland [1995] calls them, meta-agents). What, from the perspective of the larger complex adaptive system, is one of its parts, may, from its own perspective, be complete, an autonomous entity that functions within context. That same entity may, in turn, serve as the context for all kinds of other smaller entities, perceived as complete in their own right, yet interdependent in ways that give rise to the larger entity, equally displaying the properties of a complex adaptive system, but at a higher level. Interdependence, then, is what gives sense to the dialectic relationship between parts and wholes, between entities and their contexts. Such interdependence generates flows of all manner of things among entities at a particular level of organizational complexity as well as between different levels of organizational complexity. In the case of the learning society, seen as a huge conglomerate of people and social entities that are in continuous dialogue with each other, one of those flows is clearly a flow of information. However, it is important to consider that such information flow is a function of the developing interaction and not a predetermined feature of its overall design.

> "There is no unique way to describe an ecosystem.... Meta-agents are aggregates of agents and of smaller meta-agents, and themselves may be bundled into even larger mega-meta-agents. Any system is a mess of overlapping hierarchies of aggregations, limited in any particular description only for the convenience of the observer. For any such simplification of a system's overwhelming complexity, however, there will be flows among meta-agents, as well as flows within."
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> From: Levin (1999, p. 14)

The Learning Ecology
Learning – as a disposition to dialogue for constructive interaction with change – is an ecological phenomenon. Entities, from human individuals to the world at large, interact with change at different levels of organizational complexity. They do so, not in accordance with some sort of grand design. Rather, each entity, at its specific level of organizational complexity, is responsive to its immediate environment and follows often relatively simple rules of interaction.

As holds true for any complex adaptive system, the learning society will thrive on diversity. Learning and growth (growth is what constructive interaction with change results in) belong together in an evolutionary sense, the essence of evolution being that "chance and choice, given enough time, make a powerful combination for change" (Levin 1999). Diversity is essential to allow what Axelrod and Cohen (1999) call "the three key processes in a Complex Adaptive System," namely *variation*, *interaction* and *selection*,[6] to effectively do their job and contribute to growth. It is therefore important to ensure that the conditions of learning created by a society foster diversity and thus evolution.

> "Walk upstairs, open the door gently, and look in the crib. What do you see? Most of us see a picture of innocence and helplessness, a clean slate. But, in fact, what we see in the crib is the greatest mind that has ever existed, the most powerful learning machine in the universe."
> From: Gopnik, Meltzoff and Kuhl (1999, p. 1)

Factors that Foster the Evolution of a Learning Society

Multiple factors[7] promote and maintain the disposition to dialogue for constructive interaction with change and allow it to develop throughout society. Some of them are relevant at the level of individual human beings, other factors are relevant for learning that takes place at higher levels of organizational complexity, and yet other factors have to do with how people and social entities interact and fit together organizationally. The prevailing culture of schooling tends to direct societal resources – creative, intellectual, and financial ones – towards hard and soft infrastructure that emphasizes the kind of learning we engage in while being part of organized instructional contexts. It also tends to bias the allocation of resources to the age group commonly referred to as that of the school age. Such a bias is counter to the previously discussed need to foster diversity. A true learning society, therefore, must have a much broader concern with the conditions of learning. It must also recognize that establishing such conditions involves society as a whole and not merely the government entities that have been made responsible for running the school system. In other words, the citizenry at large, their communities, the media, corporate entities, and government ministries, to name but a few, they all play a role and they must play their various roles together and often at different levels.

Shifting the emphasis away from an almost exclusive focus on centralized control and intervention is part of the process to broaden society's shared focus on the conditions of learning. However, decentralization is not a panacea. "Decentralization is both promising and problematic" (Axelrod & Cohen, 1999, p. xiv) and self-organization, however much needed as a means to overcome some of the ills of centrally directed societal organization of the past, is not the only thing that makes human society tick.

Keeping the above observations in mind, here are some areas where I believe important factors reside that give rise to a learning landscape that is more harmonious and beautiful than the one we know now.

The Family

At the individual level, learning begins nine months before we are born and it continues until we die. To the extent that we are all part of the social and historical processes that contribute to the continual development of an increasingly complex body of human knowledge, learning also extends beyond our physical existence. At the time we come into the world, much is already there, embodied in the cultures we are born into, but embodied also in what evolution has equipped us with, our capacity to develop the brain structures that will remain with us as long as we live and that we may further develop in the course of our lives. It so happens that the most important phase of our neural development takes place shortly after birth. The way it happens is highly dependent on the circumstances we encounter during that period. Those circumstances relate to important physical health factors, including nutrition, as well as to how infants are able to interact with their environment. Infants who remain deprived of human interaction at those early stages seriously suffer, on a prolonged basis – indeed, for a lifetime – of such lack of attention. The family is the foremost environment in which we learn to learn, part of a socio-cultural landscape in which we

encounter other human beings in interaction with whom we get to know ourselves in relation to the world around us (see e.g. Gopnim, Meltzoff & Kuhl, 1999 and Bransford, Brown & Cocking, Eds., 1999 [particularly Chapter 4]).

> *Here's how Murray Gell-Mann, Nobel Prize winning physicist, begins a description of how he is indebted for what he learnt to his family, his city, and nature:*
> "I owe most of my early education to my brother Ben, who is nine years older. It was he who taught me to read when I was three (from a Sunshine cracker box) and who introduced me to bird and mammal watching, botanizing and insect collecting. We lived in New York City, principally in Manhattan, but nature study was possible even there. I thought of New York as a hemlock forest that had been logged too heavily..."
> From: Gell-Mann, 1995, p. 12

In this area, responsibility for creating the factors that foster learning, and by extension to help building the learning society, resides undoubtedly in the first place with the parents to whom a child is born and the immediate community of which those parents are a part. However, families don't stand on their own. The extent to which they are able to function well and serve as the starting point for any newborn's learning life, depends on all manner of circumstances, e.g. economical, social, and cultural, that surround the family. This is where we can see that even the establishment of such apparently individual factors is very much the result of the collaborative exercise of responsibility at many different levels in society.

The family is, obviously, a beautiful example of a self-organizing system. Its position at the very beginning of any individual's learning life, as well as the role it can continue to play throughout life, thus constitute an important basis for the continued regeneration of diversity. That capacity to regenerate diversity is at risk when forces that tend towards uniform patterns of interaction interfere with family life. We are all familiar with such forces that result from models presented by the mass media or advertising campaigns.[8] Other such forces may come into play when children reach the school age and families start to become overly responsive to rigid demands of the school system.

Instructional Settings

The idea that human beings should dedicate a specific period, relatively at the beginning of their life, to preparing themselves for the remainder of it by engaging predominantly in learning during most of that period, has been with us for a long time.[9] It wasn't a particularly bad idea as long as it was still possible to cope with life's challenges and respond to life's opportunities with the basic set of skills, attitudes, and knowledge that was supposed to result from this preparatory learning experience. However, that time is over.[10]

> "*In the education of scientists, one is accustomed to the need to develop the ability to function in entirely unpredictable situations, for such is the nature of scientific exploration. This points to a search for educational processes that will strive for the capability of adapting, and even thriving in areas of new problems and new opportunities. Schools must look across all disciplines, across the knowledge base of the sciences, across the wisdom of the humanities, the verities and explorations of the arts, for the ingredients that*

Naturally, during the era of industrialization, the way in which that initial preparatory learning experience was being facilitated and taken care of, became modeled after similar processes as those by which, for instance, cars could be produced. The positive side of this was that, in principle – and provided the system was managed adequately – large groups of young people could receive the same opportunities to learn, resulting in a more equitable and just participation of individual citizens in society. The downsides of the system are also well known and have been the object of fundamental critique for probably as long as the schooling system has been in place.[11]

At the current juncture in time, our focus should no longer be, in the first place, on what is wrong with the practice of schooling and how its ills could be repaired. Rather, the question is whether anything like industrial-age schooling is relevant at all. And the answer is 'No.' In a world that abounds with change, anyone's future has become unpredictable, accept for the certainty that one will always have to be prepared for the unpredictable. This realization squarely points away from the predominant pedagogical paradigms towards the direction of processes that recognize people's particular individuality, including as it relates to their emotional and intelligence make-up and their preferred styles of learning and thinking. It also points towards the ability to learn and to develop one's prowess at learning as one of the most important factors to live a fulfilled life.

In addition, and due to the much greater interdependence in today's world among human beings, the concept of individuality has been greatly enhanced as it now more strongly relates to individuals' social integration. Consequently, the emphasis in traditional pedagogical practice on the individual in isolation must make place for ways of facilitating learning that recognize the essential importance of human collaboration. In other words, the design of structured instructional contexts must as much be based on considerations of the learning needs of individuals *per se* as it must take account of learning needs that can only be conceptualized in the framework of the learning community.

Another important way in which instructional settings must adapt to today's reality has to do with our changing views of cognition. We live in a complex world of potentially multiple consequences. To effectively interact with that world we must be able to apprehend its inherent complexity, we must know and appreciate it as a complex world. This is difficult, if not outright impossible, as long as we continue to emphasize specialized knowledge in isolated disciplinary areas. The practice to do so is strongly present in many schools around the globe. It ignores the concern with learning processes that are based on people's interaction with problems. A shift of emphasis is thus required, away from what sometimes looks like an obsession with the content of disciplines, towards a focus on problems. By their very nature, problems are not only related to people's rationality. They have equally to do with their emotionality, i.e. with their dreams and interests.

This is not, though, an area for either/or choices. Being able to argue in a disciplined fashion is very important. However it is at risk of becoming irrelevant, or even dangerous, if not at the same time the capacity is developed to deal with real problems and to appreciate the fact that no vision of the whole can be obtained by adding up the views generated by individual disciplines. Structured instructional processes must focus on creating expertise, rather than specialization.[12]

The state of technology as well as of our knowledge of multiple ways to facilitate people's learning through instruction is such that structured instructional settings are no longer bound by physical parameters. The reality of distance education is but one expression of the multi-modal nature of instruction. Unfortunately, when such alternatives as distance education, or the current forms of digital technology-enabled learning, now frequently referred to – with an astounding lack of imagination – as 'e-learning', become available, it often happens that past practices are simply recast in new molds, sadly, missing the opportunity to explore the inherent prospects for fundamental change. Current discourse, inspired by undoubtedly well-intended maxims such as 'Education for All,' reinforces the tendency to look in narrow ways at the challenges of building the instructional landscape – a sub-landscape of the learning landscape – of the future. Problems get defined in terms of means – such as lack of schools or teachers – and no questions are asked about the ends that those means are supposed to serve. A radical change of rhetoric is required if one wants to avoid, like has happened so often, that new opportunities are wasted because they are merely exploited to reinforce and consolidate bad practice.

I round this section off by saying two things. First of all, I believe that there should be ample opportunity for young people to dedicate a large part of their life – say to somewhere around the age of 20 – to learning. As part of that vision, I believe that the existence of structured instructional settings is an important factor to make such learning possible. However, I also believe that it would be very bad if those structured instructional settings would not be radically different from what goes on in most of our current schools. Moreover, important opportunities would be missed if, during that early phase in a human being's life, learning were left entirely or predominantly to those structured instructional settings. Important as they are, they are not sufficient. Alternative learning space abound. The family was already mentioned. Other complementary learning settings are afforded by, for instance, the city or village in which people live; the popular culture of which they are part; the grief and humor they share; the media to which they expose themselves; the libraries and museums they visit; the games they play and toys with which they interact; the music they make and the dances they perform; the stories they tell; the flea markets, waste dumps, and places of industrial, agricultural, or commercial activity they explore; the Internet-enabled interactive environments they become involved in; or their shared amazement at the wonders of Nature.

The second thing I want to say is that structured instructional settings are not only important for young people to enrich their lives; they are relevant at any age, considering that learning is an unending process. As a factor to foster the evolution of the learning society, it is thus important to contemplate individual instructional settings as part of a comprehensive instructional landscape, in which they harmoniously fit together. Such an instructional landscape is inherently something very pluralistic. It provides a habitat for people of all ages whose circumstances, needs, and desires may widely vary. Thanks to a now well-developed instructional design tradition, much is known about how such individual instructional settings can best be shaped. The same tradition, however, is less well prepared to face the challenges imposed by the need to look at the instructional landscape in a comprehensive fashion and as one that is shaped by both external and internal agents.

The Media
In singling out the media as an important factor in fostering the evolution of a learning society, I do not in the first place think of their role in creating specific intended learning opportunities in instructional settings, such as when radio, print, TV, or the Internet are used in support of school-based learning or in the context of distance education alternatives. That role is well known and of recognized importance.[13] Here, however, I want to concentrate on other aspects of the role of media that impact on the evolution of a learning society.

Media have a powerful presence in today's world. To the extent that individuals interact with them directly, by listening to the radio, watching TV, reading the output of the printing presses, or using the Internet, the immediate impact of those media depends on whether, and how effectively, they reach people in particular regions of the world. While their coverage may be extensive, it is, with the exception perhaps of radio, far from worldwide. Nonetheless, media coverage around the globe is gradually expanding. Though large parts of the world currently remain out of reach of such media as the Internet or TV, or even the press, this does not mean that the lives of individuals in those areas remain untouched by them. In such cases, the impact of media is indirect. There are few countries, if any, where the leadership would not be profoundly influenced, positively or negatively, by their exposure to worldwide satellite broadcasts or their ability to access the Internet and to read books and newspapers. Through them, others are affected as well.

Media play an important role in positioning issues and spawning debate around issues. Debate generates discourse and discourse shapes thought processes. Established discourse influences people in their perceptions of what is and what is not important. Media therefore have an impact on the social dialogue and thus on the broad context in which learning takes place. Many of the instructional settings referred to above interact with and become influenced by the media.[14] Another important setting for learning mentioned earlier, the family, may, in some cultures, be profoundly affected by the media as well.

The influence of the media should not be seen as a boundary condition for the learning environment, something like a given that no one can change, except the media themselves. In fact, Allen and Otto (1996) refer to media as "lived environments" (pp. 199-225). Media are a dynamic component of the larger learning landscape. At least, that's what they could be and should be, even though in many cases their management and programming are strongly dominated by external forces (often of either a political or a commercial nature, and sometimes a combination of both). It is therefore important that the attitude of the public *vis-à-vis* the media change from that of passive consumers to that of critical users whose constructive interaction with the media should increasingly start determining what the media landscape will look like and how it develops. Only then can the media truly play a role in elevating cognition to a level that transcends what goes on inside the heads of individual people, emphasizing the cognitive resources that reside in the socio-cultural milieu (see also Cole & Engeström, 1993), i.e. in the ways in which people interact and collaborate.

Critical engagement of the public with the media is necessary to mitigate the otherwise unidirectional influence of what may sometimes look like an onslaught of the global media on local cultures and knowledge systems – considering their tendency to impose the language, patterns of reasoning, values and icons prevailing in one part of the world on the rest of it. For such critical engagement to work well, it is important that there be a well-developed ecological integration in the media landscape, meaning that global systems organically interact with systems that organize themselves at more localized levels such as countries, regions and communities. (A similar argument holds true for the instructional landscape, in which more and more players start operating on a global scale, as well as in the socio-cultural landscape.) Without critical engagement of the public and without sound ecological flows between media operations at different levels of organizational complexity, there is the considerable risk that global media will result in increased uniformity and in the gradual disappearance of diversity among the cognitive resources of the socio-cultural milieu.

Thus, the development of local media, such as community radio, village video, local press and community libraries, is important. Current technology has made it possible for local initiatives in this area to be developed on a shoestring basis. The World Wide Web is an interesting case in its own right. The spread of the Internet around the globe positions it clearly as an environment potentially suited for worldwide communication. However, nothing, least of all the cost of running a Web site, determines that it can only be used on a global scale. Quite to the contrary, many Web-based operations are deliberately designed to serve a small group of people only. They thus allow community building around local and specific interests. On the other hand, the ability to create hypertext links among Web pages, allows local activity to become visible and organically integrated in larger networks. The Web is therefore an interesting environment to contribute to the goal of organic integration of the media landscape.

Towards Developing and Integrating the Learning Landscape
In the previous sections the emphasis has been on three key areas whose development can have a considerable impact on how the learning society evolves. That impact can be both positive and negative, depending on how those factors develop. The scope of this article does not allow exploring multiple other factors. In this final section, I will

raise the question of what broad issues should receive particular attention in the development of the larger learning landscape and what that attention implies.

The following text is adapted, by way of example, from the learning story of Rodolfo, a Mexican boy,
<u>the one who took the world apart</u>

From a very early age onward, Rodolfo had the habit to dismantle anything mechanical he could lay his hands on. Mechanical things looked like they had some life in them. He dismantled them even though he knew that his behavior would almost certainly result in severe punishment from his parents. Rodolfo took things apart to find out why and how they worked. At the same time it allowed him to construct ideas that pertained to his world of fantasy. Thus he was able, for instance, using the parts of things he had previously dismantled, to build a 'movie' projector using an old shoebox. In the process he became aware of physical principles, not realizing that those things would normally only be taught at the bachelor level.

Punishment did not deter Rodolfo. His curiosity and interest only increased the more sophisticated the things he continued to take apart. They included, when he had reached the age of 12, those new radio receivers with 'bulbs' on them. In trying to understand how they worked he experienced electric shocks and could see sparks flashing when connecting different points with pieces of metal. He also discovered that generally, when a radio didn't work, it was because one of those bulbs was somehow damaged and did not glow the way it should. This became the key to turning punishment into reward. Henceforth, Rodolfo would repair radios and all kinds of other things, making a little profit.

Taking things apart has remained Rodolfo's preferred way of learning. Had it not been for the poverty and the scarcity of the environment in which he grew up, his creativity and sense of exploration might never have been challenged so much and he might never have discovered his secret to learning.

For almost a year now, the Learning Development Institute (LDI) has been asking people to tell their learning stories. Prospective authors were approached with three simple questions: "What is your most meaningful learning experience?" Why should that particular learning experience be considered meaningful?" "What were the key conditions that allowed that learning experience to occur?"

Results of research carried out on these learning stories were recently presented at the International Conference of the Association for Educational Communications and Technology in Denver, Colorado (Y. L. Visser & J. Visser, 2000, October). Several universities have since joined LDI to expand the effort and improve the database. The research results reveal that people perceive their learning as meaningful when any or more of the following things happen:

* Learning results in ownership of knowledge (i.e., it involves autonomous processes of making decisions, choices, guesses, mistakes and discoveries, and developing the various emotions that accompany those processes).
* Learning is maintained across the lifespan (i.e., any particular learning experience is seen as an integral part of one's lifelong involvement in learning).
* Learning lays the path for continued growth (i.e., learning is generative).
* Learning has implications in the real-life context (i.e., it is seen as inherently relevant).
* Learning results from the active involvement in facilitating someone else's learning (such as when a teacher discovers that his or her efforts to share experience with someone else are rewarded by a deepening of his or her own understanding).
* Learning changes negative self-perceptions into positive ones. (The formulation of this finding is to be interpreted against the backdrop of the initially negative experience many of the contributors to the learning stories project have had with the self-perceptions imposed on them by the traditional school system.)
* Learning results in the discovery of persistence as a strategy to manage life's challenges (indicating the importance of situating learning in the context of serious long-term pursuits).

Such learning was found to be particularly facilitated when (1) an initially negative condition could be transformed into a positive challenge; (2) a role model was present or emotionally significant support was available in the environment of the learner; (3) there were opportunities for independent exploration of one's learning as well as metacognition, i.e. for finding one's own ways to learn and reflecting on them.

Very few of the learning stories made any direct reference to the school context. Among those that did, only a small proportion reported positively about the school. The larger proportion represented stories of survival, i.e., stories of people who had been able to overcome the negative impact of the school environment on them and therefore, as mentioned above, to turn this initially negative condition into a positive challenge.

While the research effort continues and a more detailed and complete picture emerges, current results point in the direction of issues that get surprisingly little attention from the community of people who purport to advance the cause of learning. The perspective of such people is normally that of the formal contexts and procedures through which we help people to learn, or so we think. The learning processes they deal with tend to emphasize the immediate over the long-term and evolutionary; the definable over the exploratory; and the individual over the social. Does it mean that what they do is all wrong? Well, probably not, but their efforts are likely to be too focused. While there may be lots of things they do correctly, those things would only really start making sense and give meaning to people's lives if they became integrated in a more comprehensive set of conditions. The more overriding dimensions of that set of conditions relate to the integral nature of how the different factors fit together and how they situate learning, at different levels of human and social organization, within the context of an ongoing pattern of activity. That set of conditions should not just focus on the here and now but also reflect the historical and evolutionary context of which we are part.

It has always been the premise of educators, educational planners, instructional designers, educational technologists, educational communicators and the like that it is possible to consciously influence people's learning. Research on the effectiveness of instructional events, communication procedures, and technological interventions does indeed support that premise. The bulk of such research, however, has focused on narrowly defined learning tasks rather than the more comprehensive behaviors that the authors of our learning stories emphasize. Emphasis has been on the bricks, making it difficult to see what kind of building resulted from our disconnected actions to add brick to brick. No wonder, then, that the evolution of a learning society has been hampered.

Clearly, the research initiated through the Learning Stories Project focuses on a unit of analysis whose order of magnitude is distinct from that of the more traditional research. Such studies, in combination with comprehensive reviews – like the one undertaken by the National Research Council (Bransford, Brown & Cocking, 1999), that summarize research in the framework of broad themes, i.e. bringing the separate pieces of the puzzle together so that they start making sense – are important. They help create visions of the whole – visions that have long remained obscured by our overriding obsession with detail but that are nevertheless essential to appreciate the beauty and harmony of the evolving learning landscape.

Moreover, the research described above was not an isolated activity. Collecting the learning stories has often been part of workshop activities. Thus, research, creating dialogue, building new learning communities, and inspiring new ways of thinking and experiencing were – and continue to be – inseparably parts of an overall strategy to contribute to a more beautiful learning landscape.

Endnotes

[1] The author is founder and president of the Learning Development Institute (LDI). He is also the former director for Learning Without Frontiers (LWF) at UNESCO (United Nations Educational, Scientific and Cultural Organization). Information about LDI and LWF is available online at http://www.learndev.org and http://www.unesco.org/education/lwf/, respectively. Any opinions expressed in this chapter are entirely those of the author and do not necessarily reflect official policy of UNESCO or the Learning Development Institute.

[2] I am referring here to the various theories about how the structure and function of the nervous system evolved in the animal kingdom. The human nervous system reflects that evolutionary history. One way of dividing the nervous system up is by differentiating between the slowly reacting limbic system, responsible in the first place for regulating our bodily functions, and the thalamocortical system, consisting of the thalamus and the cortex, which allows us to respond intelligently to signals from the outside world. The thalamocortical system came later in the evolution than the limbic system. But also the cortical system itself evolved. There is also a classical theory, the so-called theory of the triune brain, which refers to three stages in evolutionary development of the brain structure, namely the reptilian brain, the old mammalian brain and the new mammalian brain. Again, they are believed to have developed sequentially in that order as the evolution progressed. Human intellectual development is often treated as having solely to do with the parts of our brain structure that are typical for us, humans, and nothing with those other parts that we have in common with other animals. This leads, for instance, to the neglect of emotional needs and potential in much of the school pedagogy.

[3] See also the forthcoming International Handbook of Lifelong Learning (J. Visser, 2001).

[4] Another problem, of course, is that researchers in the area of complex adaptive systems, in their zeal to be precise, and often reluctant to retreat from previous formulations, sometimes adopt different terminologies to say the same thing or say different things using the same words. Gell-Mann (1995) explains the all too human background of this tendency, referring to the old saying that "a scientist would rather use someone else's toothbrush than another scientist's nomenclature" (p. 18).

[5] Some excellent sources for further reading are Gell-Mann's (1994) "The quark and the jaguar: Aventures in the simple and the complex" and Axelrod and Cohen's (1999) "Harnessing complexity: Organizational implications of a scientific frontier."

[6] The reader will be familiar with how, in the biological world, variation within forms of life, interaction between organisms, and processes of (self-)selection within living systems hang together.

[7] In this section of the paper I use the terms "factor" and "condition" interchangeably. The phrase "conditions of learning" is more specifically referenced to the instructional design field, particularly the work of Gagné (1970/1985). While I recognize the great contributions of that work, my critique focuses on the narrowness with which the instructional design field tends to look upon itself. I contend that more conditions play a role than just the ones defined within the instructional context, referring to that wider range of conditions as "factors." According to the dictionary, a factor is "any of the circumstances, conditions, etc. that bring about a result." Alternatively, it is described as "element or constituent that makes a thing what it is" (McKechnie, Ed., 1983). I use the term in both senses. I also use the term "area." An area, such as the family or the media, represents a large collection of factors. However, all those factors that make up a particular area taken together, the area itself can also be seen as a factor in the larger context. I therefore also refer occasionally to "area" as a "factor."

[8] The literature in this area is vast (e.g. Thussu, 2000). The problem has, among other things, to do with how messages are being framed and how the voice of some of the big players in the world gets magnified due to the processes of globalization. There are currently different opinions concerning how serious and unavoidable a problem this is, some authors suggesting that there are counteracting forces that will lead to greater heterogenization (e.g.Appadurai, 1990).

[9] The schooling practice is but one expression of that idea. One can equally find it reflected in the preparatory learning practices and accompanying rites of societies and communities where the school has not penetrated.

[10] Even when that time wasn't yet over, it has, of course, always been a problematic notion.

[11] Regarding the need to rethink the idea of schooling, reference is made to a concept paper (available at http://www.learndev.org/dl/RethinkingSchool.PDF) for an intended series of international symposia on this issue.

[12] While these concepts are often confused, I refer readers to Bransford, Brown and Cocking (1999), particularly Chapter 2, for further elucidation on this issue. All people are experts in some areas. For instance, we are all expert users of our mother tongue and most of us are able to expertly navigate in our local traffic environment. In fact, we may lack such expertise when placed a different environment. An important dimension of expertise is that we are able to recognize and work with meaningful patterns of information. Learning to do so requires that we operate with relevant chunks of knowledge and are able to see the whole in which such chunks of knowledge fit like pieces of a puzzle. Specialization works counter to developing this ability.

[13] The instructional role of media should be contemplated within the *overall context* of instructional settings mentioned in this paper. Its value in that context, as well as the critique of media use, should be discussed with reference to the same standards that apply to judging such instructional settings if they were of a more conventional nature. In other words, there is much in such media use that shows the same flaws that can also be found in the traditional school context, such as emphasis on rote learning of unconnected pieces of knowledge through instructional procedures that emphasize information transfer over deep learning. On the other hand, there are also excellent examples of media use for deliberately designed instructional purposes that result, for instance, in the development of critical attitudes and skills to deal autonomously, within a community context, with real-life problems.

[14] One need but think of the uniformization of behavior among school kids as their tastes and desires are being shaped by their exposure to a limited number of cultural and commercial products, often packaged together.

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Nurturing: An Alternative Learning Cosmology
Cole D. Genge

In the Andean world[1] of South America, where "everything is alive and everything speaks, …where all are relatives, […] all are important and necessary, […] Nature speaks to the farmer, just as the farmer speaks to nature."[2] From this symbiotic relationship — that itself grew from the sweat and soil of the Andes — wisdom is understood as nurturing and allowing oneself to be nurtured. In this sense, nurturing "connotes a caring relationship that lets the nurtured one come forth freely," where the "very act of nurturing, of caring for, nurtures oneself" and "allows for the nurturer to participate in the unfolding and growth" process.[3]   This nurturing process is one of constant interaction, of continual, creative and diversified trial and error. It is a lifelong endeavor that is sharpened by doing, by hearing, by seeing, by caring and by being supportive of others in their midst. In this way, a larger social network is shaped by collective altruistic behavior.

Studies in recent years in various fields — from psychology to quantum physics, from biology to education — allude to what native peoples around the world have known for centuries: that the greatest potential for learning occurs, when nurturing social support networks are functional and well-established. The traditional elements of the Andean world could very well be understood as learning societies, for they have social support networks for meaningful learning both at individual and societal levels.

In the pages that follow, I will look at some of the foundational characteristics of learning within an Andean cosmology,[4] one that is fundamentally based on the concept of nurturing. The basis for this article stems from my interactions with personnel from Cai Pacha/PRATEC (an indigenously initiated non-governmental organization that advocates a return to the roots of pre-conquest Andean values, beliefs and lifestyle, which centers around agriculture and a deep connection to nature). In the first section, I will focus on some of the attributes of nurturing as they relate to learning. In the second section, I will examine the following three areas: a) the nature of Andean wisdom; b) the experimental nature of traditional knowledge; c) learning from childhood. In the final section, I will look at challenges nurturing faces as an approach to learning.

Attributes of Andean Nurturing
The concept of learning as a nurturing process is at the very root of Andean cosmology. As such, far from being theoretical, it is a strongly 'lived' experience. The senses (sight, smell, and taste) are used as a window for direct dialogue with the world, and the nurturing of Nature is alive and personified. That is, Nature converses with those who are willing to converse with it. It is a wordless dialogue, one that is reflected in the prediction of the coming of rains, by the color of the sky, or by the taste of the winds.

In this sense, everyone and everything 'knows,' and everyone and everything has culture (as understood by the Latin root for *culture*, i.e. *cultus*, "to cultivate or to nurture"). In the Andean world, *cultivate* and *nurture* are used interchangeably. The capacity to nurture is inseparably linked to the capacity of letting oneself be nurtured. This allows the nurturing process to flow through oneself.   In this way, nurturing is embedded in the self, but it is also porous and open to "other knowledges" in the world. Thus, the emphasis is placed on those who establish a nurturing relationship. It is therefore not merely an individual act; it embodies the whole – both human and non-human.

But for nurturing to occur, establishing a simple relationship is not sufficient. Rather, nurturing involves a communal or collective participation in building a relationship of empathy. It is not a conscious act of agreeing upon