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An ecology of media, technology and design

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Abstract

It is a mediated experience through designed artefacts, systems and environments that human beings relate to the earth. The already transformative effect of this mediated existence has accelerated sharply with digitalization. In this research, we take the dichotomies of nature/culture and human/environment and the consequent miscalibration between human intentions and ecological results as the root cause of the current ecology and mind crisis, and we approach the situation as a 'design failure'. We intend holistically to propose a conceptual design guideline, as a contemplation tool to be able to 'think like a mountain,' which proposes a set of common principles that healthy ecosystems are supposed to carry.

Keywords: Mediation, Digital technologies, Design, Systems approach, Ecology

Introduction: A deep and digital media ecology

Being human comes along with designing media, which in turn designs the way we relate to the world around us. Human beings experience the world through mediation and mediated environments, be it language or technologies. This is also the source of the so-called nature/culture dichotomy. Through this dualistic epistemology, nature is comprehended as a body of entities to control, manipulate, utilize and liberate from, and technologies mediate this externalization and transformation of nature into industrialized cities, artefacts and culture (Stuart 2007, pp. 418-419). David Abram invites us to an embodied understanding of the phenomenon:

> *"Today our relation to the enfolding earth is filtered through a dense panoply of technologies – from air conditioners that mask the heat, to electric lights that hide the night, from capsuled automobiles that hustle us hither and yon to earbuds and headsets whose self-enclosed sounds eclipse the layered silence of the land, blotting out the hum of bees and the whooshing wind whose voice swells and subsides into the belly of that silence*." (Abram, 2010, p. 263)

Considering our mediated relation to the planet and the members of our species, what we see consequently is a world in ecological crisis. This is not only an environmental, but also a 'mind' crisis. It has almost been a century since Bateson (2000) took his bold steps towards an understanding of 'an ecology of mind', bringing together ecology, anthropology, evolutionary studies, and cybernetics from a 'systems' perspective; yet the world seems to be getting further and further away from this vision. What is the role of mediation in this?

Pioneer ecologist Eugene P. Odum states that design practices affect the whole of human civilization in the hierarchy of society and environment, and 'a holistic approach is necessary when dealing with complex systems such as human civilization' (1997, p. 315). Design, however, is a field that is inclined either to exert anthropocentric values or to follow the 'value-free' discourse of science and technology. Considering the effect range of design practices and assuming that there is a mind and ecology crisis, we focus in this research on the design of mediated environments, the artefacts that mediate our every bit of experience from a normative ecological perspective.

Every artefact that has come to be invented is an embodiment of technology. The change that technology brings is ecological and thus holistic, as it not only adds a new value to the system but also changes the whole relational structures of the body, mind, society and environment (Postman, 1993, p. 18). Although this fact encompasses even most 'primitive' tools, such as glasses or a cane, the process has accelerated sharply with the advent of digital technologies. Over the last decades, digitalization seems to be overtaking life so much so that even most basic daily practices become embedded with them and gain this aspect of interactivity.

As of today, we do know that "to design digital artefacts is to design people's lives" (Löwgren & Stolterman, 2007, p. 1). These are meta-technologies or meta-media with the capability to change it all (Lauria, 2001). The transformations that would take decades and even centuries after the invention of each technology now take place only in years. The boundaries between the body and artefacts have blurred, and digital media, which is ubiquitous and pervasive, has become more than extensions of man (McLuhan, 1962). Apple designer Jonathan Ive, one of the most prominent designers of our age, however, declared during his knighthood ceremony that they 'don't spend much time thinking about [their] impact' on the modern world (The Guardian, 2012). And this was an argument yet limited within the scope of the human world. In the world of computer technologies and interaction design, environmental impacts are mostly regarded separately from social/physiological/cognitive impacts of design.

Being one of the prominent causes of environmental crisis, the miscalibration between human intentions and ecological results is a design failure, and the solution is 'better design' (Orr, 2002, 14). If a better design is the design that is calibrated to ecology, then we need to shift the mindset of designers so that they can think ecologically. The term *ecology* here refers both to environmental ecologies around planetary ecosystems and to the holistic and inter-related systematics that these ecosystems run. Thus, it refers to the law, the *logos* of such systems from a systems theory perspective.

As designers and scholars, we need tools to be utilized right at the design stage, so that we can foresee the vision of the future that our designs contribute to, from an ecological perspective. Aldo Leopold (1968, p. 129) proposes the statement 'thinking like a mountain' as a metaphor for the holistic thought process of ecological view. This research, accordingly, focusing on the strategies that planetary ecologies have brought up from an evolutionary perspective, aims to reveal the characteristics of a healthy (eco)system, be it in a mountain or cybernetics. A guideline will be presented with those characteristics as heuristics, as a tool for 'thinking like a mountain' in human terms, for designing interactive media and technologies and for a holistic contemplation of occupational ethics.

Background: Ecological approaches to the design of digitally mediated environments

Ecological notions approach

Although the very roots of media technologies can be considered cybernetics, let alone ecological thinking, holistic systems thinking has been a rather recent approach in the design of digitally mediated environments. The earliest ecology-related concept that played a prominent role in the field was Gibson's ecological psychology, with the best-known and most common adoption being the concept of 'affordances' (Norman, 1988). In the frameworks that have been proposed more recently, complex configurations of people, interactive systems and artefacts (with digital technologies embedded in them) surrounding the environment and practices and values of the people in that context are interpreted as ecology in themselves. Some of the notions that these ecological perspectives propose are (1) product/device/artefact

ecologies, (2) information/interaction/service ecologies, (3) ubiquitous ambient ecologies and (4) personal/user ecologies.

Although we can see several technology or process-centered notions, these perspectives can be broadly addressed as either 'artefact-centered' or 'user-centered'. These approaches take ecological notions metaphorically and out of the environmental context, and the common research question behind them is 'how to adopt ecological notions in settings of human-artefact interactions' (Blevis et al., 2015; Raptis et al., 2014).

Environmental design approach

When we shift our focus from the artefacts, humans and their mediated environments to the environmental issues, earth ecologies and a broader selection of design fields, including architectural, industrial and urban design, we come across the fields of sustainability, environmental design, regenerative design and so forth. These eco-design notions, contrary to the previously mentioned ecological approaches, are either eco-centric or still anthropocentric, with the understanding of the human as a species that cannot survive if the planet fails. There is a huge literature and background with distinct perspectives behind these. Some of the common and key concerns from our point of view are product life cycle, energy consumption, green materials and community.

As for the design of digital and interactive mediated environments and new technologies, just recently a growing community has emerged with environmental concerns and an interest in environmental design. Following the fields of environmental informatics or eco-informatics, the common research questions behind these are how to make interaction designers aware of environmental implications of their design decisions to contribute to designing more sustainable products, and/or how informatics can increase our preparedness for 'future of scarcity' scenarios (Blevis et al., 2015; Raptis et al., 2014).

Bringing together two approaches

In this research, we are interested in the world vision, the mindset that our designs contribute. Our research question is how an interactive media design product could behave as (part of) a healthy ecosystem itself. Our approach is neither human nor artefact-centered; we hold the planet-wise concerns of the eco-design approach. Mediated environments are situated on the planet not only physically but also as a part of the interaction network. What kind of interaction, experience and attitude a design artefact or system asks from a user-human is quite interrelated with the behavioral and even spiritual patterns that are exhibited by the user-human as they interact with another species of the planet. 'An interaction designer takes part in creating a dynamic gestalt', argue Löwgren and Stolterman (2007, p. viii), comparing interaction design with performing arts rather than architecture and industrial design.

Ecology is about relations. Our designs not only contribute to the material cycles like product life, energy, waste and feed cycles of the earth, but also behavioral, relational, perceptual and spiritual cycles and transactions in between all. Thus, we intend to propose another eco-design guideline for designers, yet focusing on not the materialized discussions but the minds, and along with it we also intend to transfer ecological notions into the design context, yet without losing the 'earthly' context of ecology itself.

Guideline: A humble step to an ecology of a mountain's mind

> *"…I picked up a vague mystical feeling that we must look for the same sort of processes in all fields of natural phenomena – that we might expect to find the same sort of laws at work in the structure*

of a crystal as in the structure of society, or that the segmentation of an earthworm might be comparable to the processes by which basalt pillars are formed." (Bateson, 2000, p. 74)

To take this step, as an attempt to unearth the thinking patterns of a mountain, we delved into a list of distinct but inter-related fields of nature, poetry, science, philosophy, politics, design and media, all of which have an environmental/ecological stake. We analyzed the proposed 'solution patterns' and came up with a conceptual model that first categorizes and then unites all solutions as the requisite principles of a healthy system.

In the following section, we summarize our guideline, which consists of six concepts. These can be elaborated as both guiding principles for designing and criteria for evaluating design. Each concept has three defining parameters to be used as a list of heuristics. The parameters are presented in the final paragraph of each concept and Figure 1.

We invite the readers to contemplate these six concepts, the relational structure they constitute and the vision they paint overall. We suggest a simplified visual representation of our principles, their mottos and parameters as in Figure 1 to accompany the discussion below.

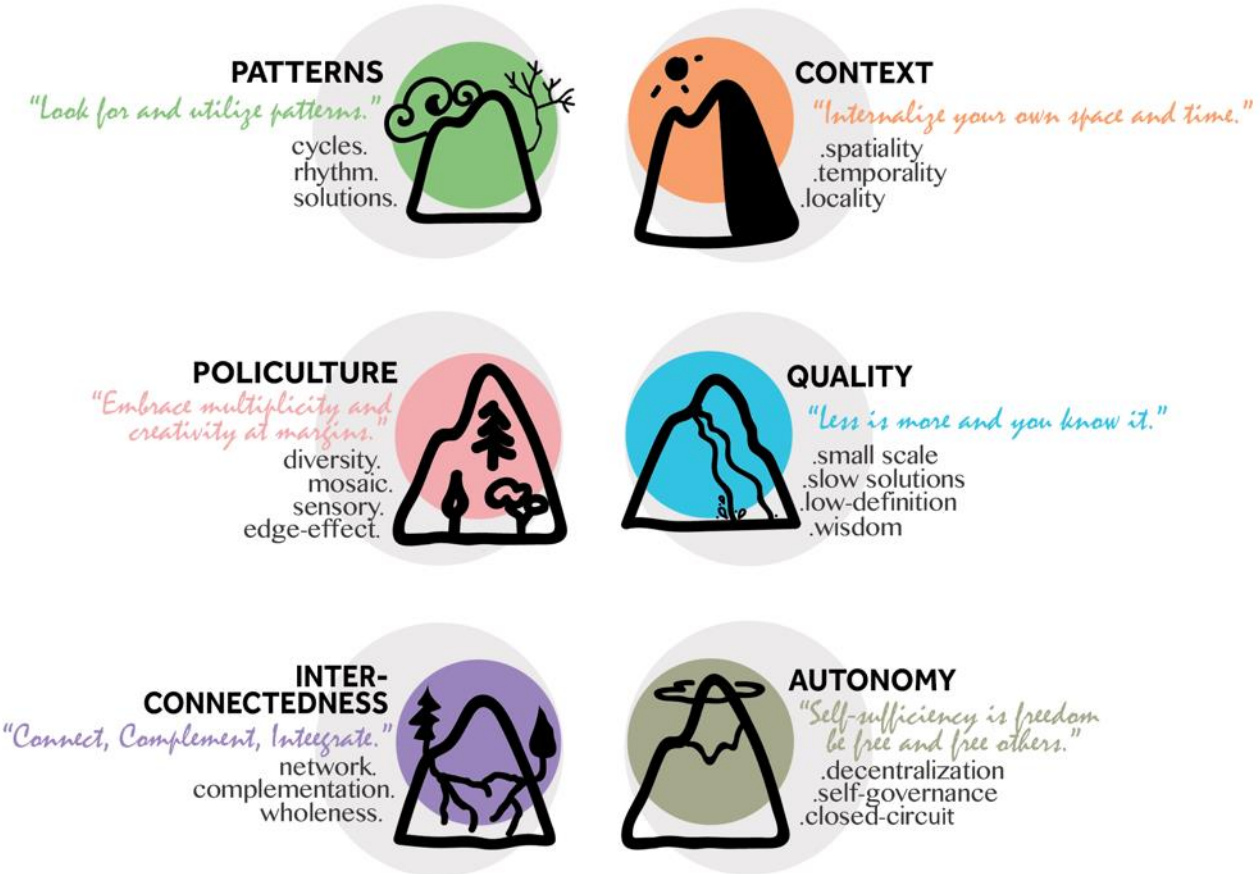

Image 1: Ecological principles for design.

Patterns: Find and utilize them

Natural forms, structures, processes, behaviors and interactions are all woven by repetitive patterns and strategies. These prominent patterns speak in mathematics, geometry and rhythm. Cycles and spirals are

among the most common patterns from plant structures to the activity patterns of animals, a hawk skydiving into its prey for instance, from storms to oceans, from galaxies to nature's time of seasons.

Rhythm in terms of self-similarity or modular repetitions are also among the 'the patterns which connect' all living beings from a crystal to society (Bateson, 2000). Fractals (as in tress, mushroom, broccoli etc.) are a specific implementation of this pattern.

The mountain asks the designer to begin by asking and observing how nature would solve this. The reason nature displays similar patterns as strategies and why local and traditional cultures have utilized patterns so much in their art and culture, is because 'these are the ones that have proved successful' over millions of years of evolution (Orr, 2002, p. 38). Artificial modern systems, on the other hand, which are mostly linear and hierarchical, represent an unsustainable world vision that is bound to end (Orr, 2002, p. 162). What if the first iteration of the Macintosh had shipped, Lanier asks (2010, p. 13), in which the whole computer experience was designed on a completely contrary metaphor of a singular structure without a hierarchical file/folder system?

When we go with nature, not against it, we then realize there is indeed no problem in nature, but only knowledge and solutions. A taproot weed in barren land may not be a problem to be solved by using force and removing it. Information about the argillaceous soil whispers the solution that one should first heal the soil, otherwise one can only grow taproot plants here.

To integrate the 'patterns which connect' in your design, get equipped with the proven wisdom of nature, by tracking the flows in natural processes and relational transactions. Specifically, be aware of and utilize cycles, and let your design beat it by rhythms through repetitions and self-similarities.

Inter-connectedness: connect, complement and integrate

The inter-relatedness of all and unity as such is the first principle of ecology. In cybernetics, as in biology and ecology, holistic systems are woven not by singular entities (nodes) but by the relations and interactions (edges) in between them (Bateson, 2000, p. 316).

How we see the world changes how we relate to it. Local and indigenous cultures perceive the world as a network of relations where every living or non-living being is related to each other in a reciprocal responsibility (Orr, 2002, p. 10). A summary of this principle is *Mitákuye Oyás'iŋ,* the sacred phrase of the indigenous Lakota people of North America, which is translated to 'all my relations' or 'all are related'. A law execution practice that embodies this principle, as narrated by the cultural anthropologist Michael Wesch (2010), is a practice by a remote indigenous culture in the rainforest of Papua New Guinea, in which 'the relationships' are brought to the court instead of individuals, with the intent to restore the relations, not to punish individuals. This indeed is an approach in harmony with ecology, for the unit of survival is not the species in a bloody competition but the common habitat in which species are interdependent with each other (Odum, 1997, p. 200; Bateson, 2000, p. 332). The predator, for instance, by hunting the old, the sick and the weak, controls the population of the prey animal, prevents over-grazing and maintains the health of the herd. This is part of the knowledge that Aldo Leopold (1968, p. 129) had read in the eyes of the wolf he killed, part of the wisdom that only those who think like a mountain can hold (Odum, 1997, p. 193). The mountain knows that the human is not *in* the environment but a part *of* its relational total-field (Naess, 1973, p. 95).

A permaculture designer does not settle with the observation of individual entities. In accord with Gestalt's 'the whole is more than the sum of its parts' principle, the relations are observed and designed, as in the case of building a coop so that it could also provide heating for the house or planting unions of different vegetables that complement each other's mineral or water necessities (Mollison, 1994, p. 5).

The mountain has witnessed that anything is hitched to everything else in the universe (Muir, 1997, p. 91). The ecological design begins with the realization of the ubiquitous inter-connectedness around us. In your designs, implement a network of wholeness where parts do not compete but cooperate for integration over fragmentation and for harmony over hegemony (Lyle, 1996, p. 39; Orr, 2002, p. 29).

Polyculture: Embrace multiplicity and creativity at the margins

Contrary to the evolutionary procedure that requires the organism to regulate itself according to the environment, human beings organize their environment and create monoculture ecosystems. The disappearance of almost all non-human species in urban environments, fields that grow only one type of crop, bacteria cultures and mice colonies in laboratories and many other monoculture investments are all driven by technological progress. These domestic species, however — controversially argued to include modern humans, too — are not suitable for evolutionary survival (Bateson, 2000, pp. 446-453; Orr, 2002, pp. 114-115; Shiva, 1993).

City culture recalls diversity. However, when this diversity is distributed and diffused into the city texture without context, it homogenizes, as in the case 'when many colors are mixed, in many tiny, scrambled bits and pieces, [and] the overall effect is grey' (Alexander et al., 1977, pp. 42-50). To prevent this homogenization, Alexander et al. propose a *mosaic* distribution with many local centers of sub-cultures (1977, pp. 42-50). As well as preventing assimilation, this is necessary also for the *edge-effect* to take place, like in a coral reef where two distinct existences intersect, and hallmark ecology emerges out of this synergy (Mollison, 1994, pp. 28). Large margins for transitions, frontiers and interfaces increase resilience.

As for media and technology, one of the two remarkable aspects is the dominance of seeing and visuality in sensory perception. Human beings have lost their primitively more inclusive olfactory, auditory, and tactile sensual capabilities mostly to the eye, which, by creating subject/object dichotomy, has externalized the experience of the world (McLuhan, 1962, pp. 28-29). *Monotechnic* is the other underlined problem as in the case of the medium of the car, which does not leave space for other types of transportation, or in the case of smartphones, which, by bringing them together in it, has assimilated many other 'old' media (Mumford, 1993, pp. 235-239).

The mountain is plural. From steep sides to vast highlands, from barren canyons to fertile valleys, from hidden caves to sharp peaks, from meadows to trees and from wolves to bees, the mountain contains so many. For *polyculture*, aim for *diversity* in every area from technology to sensual perception, a *mosaic* of heterogeneous distribution of these varieties and an emphasis on the *edge-effect* in between.

Context: Internalize your own space and time

In cybernetics, the fact that the relation of every node to the larger systems around it is different from the relation of other nodes to the same system, is *context* (Bateson, 2000, pp. 332). A letter in a word, a word in a sentence, a sentence in a text and all other content is meaningful only in a context and 'context is the precursor to communication' (Bateson, 2000, pp. 408).

Time and *space* are two variables of context and, ecologically speaking, every situation or transaction is bound to *its own* time and space. The biological and social rhythms of beings that think like a mountain are integrated with the cyclic clocks of nature. Their time ticks simultaneously with their heartbeats, and their space is the muddy land underneath their feet. Both are hardwired in and cannot be comprehended separately from their momentary experience. For local communities, the land is not a commodity but an entity that embodies the souls and the memories of their ancestors, the past and the future of their children, their identity and culture (Alexander, 1977, p. 37; Orr, 2002, p. 11;). Whereas the ethical, political and economic protocols of locality inherently limit and prohibit the damage that a community can cause to their ecosystems, remoteness opens up the way to 'tyranny' (Odum, 1997, p. 303; Orr, 2002).

The modern human, on the other hand, perceives time and space as external, linear and quantified concepts and abstracts them through maps, clocks and calendars. From ambient to mobile, context-dependent design in smart systems has been a concept on the rise. With the advent of sensory, biofeedback and location-aware technologies, the spatial, temporal, physiological and/or environmental situation of a user can be tracked very easily. Yet, this abstracted and information-processed context paradoxically separates people from the real time and space they inhabit, when the user experiences a place as 'mere coordinates', rather than a 'meaningful existential locale' (Vollrath, 2016). 'The map is not the territory', and it can only represent reduced and quantified information about the land, which is why our relationship with the map vs the land must have different ethics (Bateson, 2000, p. 408; Mollison, 1994, p. 34).

In what time does a transaction occur between a human organism that is based on continuous sensory-motor and cognitive processes that have to be synchronized precisely in time and a computer that is based on discrete, asynchronous and timeless events (Lanier, 2010, pp. 11-12; Varela et al., 1993; Lakoff & Johnson, 1999)? The remedy to moral, behavioral and economic failures of information technologies may be in the fact that in nature every creative process including evolution is bound to the local *context* (Lanier, 2010, p. 138) and to *spatiality* and *temporality* in unity with momentary experience.

Design for real people in their real context and consider their unique 'season' that abounds in the physiological cycles and rhythms of both themselves and the earth and their own 'place' in the environment that they are situated in and out.

Quality, less is more, and you know it

Defining intrinsic qualities such as intelligence or excellence of phenomena through quantities has been in favor since the dawn of modernity. This has led to the perception that the value or goodness of phenomena increases by numbers. Development, progress and acceleration (the more, the faster, the better) have been economic and political reflections of this paradigm shift.

However, on a planet with finite resources, no phenomenon can grow infinitely without damaging its environment. And quantities are not proper tools to define organisms and their interactions in ecological, biological or cybernetic systems. Form-wise, relational and pattern-wise qualities are prior; 'sometimes small is beautiful,' and both biological and social systems have optimum ranges (Bateson, 1979).

Small scale and locality bring virtue by limiting the scale of the damage that humans can do. For instance, not only human beings but also other organisms and processes in nature release toxins. The latter do this,

however, in very small numbers and in a closed-circuit system, which is why theirs are ignorable as opposed to the human-driven toxic waste problem.

Technologies both connect and alienate by scaling up time and space. The automobile, which promised to bring people closer, has wiped the human scale out of urban design by scaling them up in metal bubbles and alienated them from each other, the city texture and the land. High-rise buildings, similarly, have separated habitats from hearing, smelling, experiencing and participating in the street life below (Alexander et al., 1977; Mumford, 1993, pp. 235-239).

As for information technologies, from wisdom to knowledge, to information and to data, the rise of the communication age has freed information from spatial and temporal contexts that are bounded by the human scale. We are exposed daily to a flood of information of which speed is before its content. And its waters are shallow because information under-represents reality (Lanier, 2010, p. 132). Another bell rings for the myth of crowd wisdom, that enough quantity will turn into quality, and its duality that trolling and intended harm to others are on the rise. If '[q]uality is the response of an organism to its environment' (Pirsig, 2000, p. 254), what kind of a response these high-speed new media environments trigger in us is a game-changer.

The 'bigness' of a mountain comes from its age-old time. Indeed, it is so slow that it is as small as its time permits. Time and space are abundant in quality and wisdom. Even modernists have come to know *multum in parvo* as 'less is more' when it comes to design solutions. Carry this motto to a broader context, as sometimes *small* is beautiful, *slow* solutions are the resilient ones, and only *low-definition* channels can convey wisdom.

Autonomy: Self-sufficiency is freedom, be free and free others

Generated from *auto,* i.e. 'self' and *nomos*, i.e. 'law' in ancient Greek, the simplest definition of *autonomy* is *self-governance*, which requires decentralization and horizontal reorganization of once unilateral and external power structures. The distribution of control, power, wealth and knowledge is inherent in ecological organizations like local cultures, and in cybernetics no component can exert unilateral power on others as a built-in rule (Bateson, 2000, p. 315; Lyle, 1996; Orr, 2002, pp. 114-115). The natural or cultivated sustenance of all autonomous systems depends on an internal organization of interconnected input and output variables in balance, so as not to become toxic by exceeding threshold values. Complex cybernetic systems are *homeostatic*, i.e. self-corrective through 'governing loops' that not only constantly check and keep the variables in between optimum threshold values, but also dynamically prevent habits from occurring due to a variable getting stuck in a static value and becoming hard-programmed (Bateson, 2000, p. 511; Bateson, 1979, pp. 26-73). The control mechanisms and limits that are intrinsic in small-scale and local systems may have to be introduced specifically in digital systems. In design, limits do not restrict; on the contrary, we need them as they free us (Orr, 2002, p. 122).

Another parameter that increases autonomy is *redundancy,* which requires every component to have a backup in the system. In permaculture this is formularized in two ways; (1) each element has as many functions as possible, (2) each function is supported by as many elements as possible (Mollison, 1994, p. 6).

Autonomous systems and beings are instantaneous like the sun and do not 'steal' from the future. They limit transactions with the environment, and non-renewable resources are only consumed for evolutionary transformations 'as a chrysalis in metamorphosis must live on its fat' (Bateson, 2000, p. 504).

From *distributed* and *decentralized organizations* to *self-governing* loops, these mechanisms are most possible and efficient in a *closed-circuit* system. Because '[o]nly the autonomous can plan autonomy, organize for it, create it' (Bey, 1991, p. 102), be like a mountain, as there is no better matching metaphor for autonomy but the mountain.

How to use this guideline

Despite carrying the same '*patterns* which connect', in nature there are various strategies for incorporating them. It is the same with this guideline. The strategies and methods that would work best depend on the *context* of the (design) problem. This multiplicity of strategies is supposed to be a *polyculture.* Due to its *qualitative* nature, we cannot present an objective and fast-proven generic method. That is why we propose 'contemplation' as the first method to consider.

PATTERN	Observance and use of natural patterns in forms, structures and problem solving methods.	**CONTEXT**	Socio-cultural, historical or ecological context. Tempo-spatial awareness and locality.
cycles	Non-linear, circular, spiral patterns.	***spatiality***	Intrinsic spatiality, place bound experience.
rhythm	Self-similar, rhythmic, fractal structures.	***temporality***	Cyclic time (age, season, etc.) intrinsic to experience.
solutions	Long-term and eco-mimetic solutions.	***locality***	Ecological context and local belonging.
POLYCULTURE	Support variety, multiplicity and encounters.	**QUALITY**	Quality over quantity, small, slow and wise solutions.
diversity	Diversity of languages, media, and culture.	***small scale***	Smaller and human scale.
mosaic	Non-uniform and heterogeneous distribution of polyculture.	***slow solutions***	Slower solutions.
sensory	All-sensory awareness rather than dominance of visuality.	***low-definition***	Low-definition and contextual information flow.
edge effect	Stress on marginal, edge areas where encounters occur.	***wisdom***	Consideration of higher systems, wisdom over data.
INTER-CONNECTEDNESS	Holistic approach and focus on the relationships between the parts.	**AUTONOMY**	Self-governing closed systems with distributed/decentralized power structures
network	Weaving relations between system nodes/subjects.	***decentralization***	Horizontal and decentralized organization of control and power
complementation	Stress on not competitive but complementary relations.	***self-governance***	Self-regulating control and limit mechanisms.
wholeness	'The whole is more than the sum of its parts'.	***closed-circuit***	A closed-circuit systematization of product / service life cycle.

Table 1: Quick reference card for principles as design heuristics.

The concepts are presented one by one due to format issues; however, there is no linearity among them. Each one is an *autonomous* and self-proclaimed characteristic, yet also a part of the guideline as an *inter-connected* network.

As an example of this relational structure, observe in Figure 2 that there is a balance of 'singularity vs. plurality' in the system maintained by two relations. The first is the 'dependency/inter-dependency balance

between *interconnectedness* and *autonomy*, and the second is the 'multiplicity/essentiality' balance between *polyculture* and *quality*.

We chose to begin with *patterns* and cycles and end with *autonomy* and its cyclic closed circuits so that we could turn back to our starting point and close this cycle. *Patterns* are the beginning of all and *context* is our base.

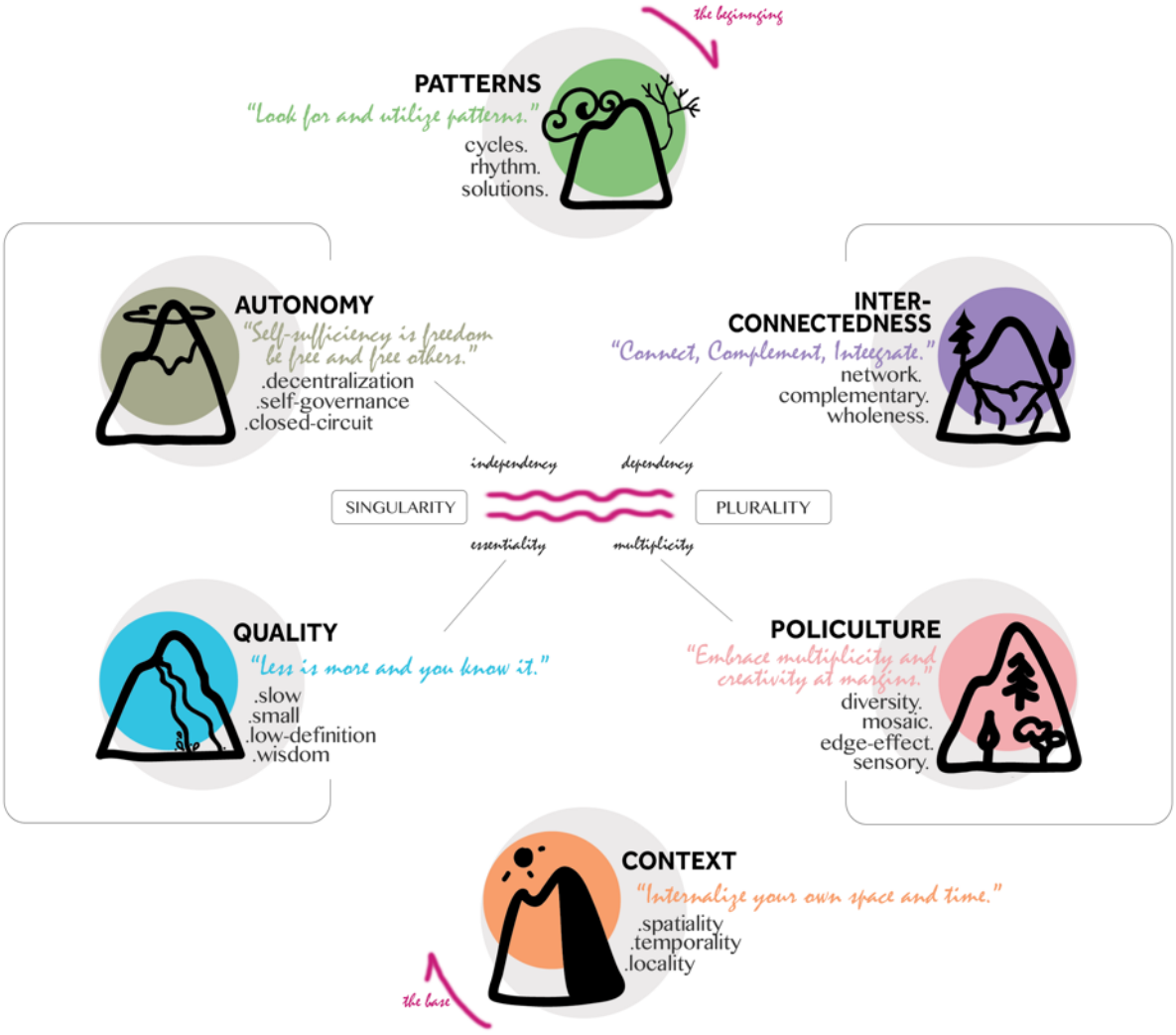

Figure 2: A relational reflection on principles.

Conclusion, many ecologies

> "Single and free like a tree, and in fraternity-like a forest" (Ran, 1966)

According to Abram, 'the glimmering stars of the night sky appeared much closer before the invention of the telescope (2010, p. 154). Yet, is the telescope to blame? It is a fact that an ever-expanding complex of technology is mediating between our bodies and the earth. Contrary to indigenous people who talked 'to' the earth, in our mediated world we talk 'about' it from a distanced, hygienic and synthetic comfort zone (Abram, 2010, p. 188). With the advent of digitalization, which imposes its interaction networks, the

interfaces between our bodies and the earth have become pervasively ubiquitous. However, a purist 'anti-technology' stance in eco-philosophers 'seeks to unravel the traditional dualism between nature and society, may contrarily be serving to strengthen this dualistic epistemology' (Stuart, 2007, p. 422). Pessimism in the face of media and technologies has roots in overall disappointment with humanity and modernization, beyond media and design. According to Horkheimer and Adorno (2002), the only thing that man tries to learn from nature is how to use *techne* to dominate nature and other men. According to the mainstream evolutionary theory as depicted in the *Dawn of Man* scene in *2001: A Space Odyssey* (Kubrick, 1968), indeed it is. Violence and dominion were the first actions of the primate beings that awakened to the use of a tool: a bone as a weapon. Yet, a weapon is not always a 'weapon'; sometimes it is language. Depending on the point of view, the telescope does make the glimmering stars much closer to some. Depending on how it is designed, in the Heideggerian sense, it can reveal a hidden truth like the *poiesis* of a seed sprouting or a poem being written. The watermill brings forth the flow of the river and utilizes its energy without ever manipulating its course and intensity, contrary to the hydroelectric power plant, which changes the ontology of the river such that the river may stop being a river (Heidegger, 1977).

As another instance, let us consider the horse. 'If the horse is your primary mode of transportation, there are some things that you cannot do' (Orr, 2002, pp. 5-6). You cannot farm more than you need, for instance, you cannot desire to take over your neighbour's land, you cannot blow up a building and escape, you cannot escape the time and space of your land (Orr, 2002, pp. 5-6). Because the horse limits the size, the speed and the power you can have and control, you have to become an active observer and part of the time and processes of your land. Yet the horse is not a human tool but a living being that knows how to think like a mountain. What we need in the bottom line is a design that metaphorically behaves like a horse, as in the case of the watermill or the telescope. Each is a perfect example to meet our guiding ecological principles of *patterns*, *interconnectedness*, *polyculture*, *context*, *quality* and *autonomy*.

The purpose of this research was to seek an ecological approach for designing interactive media and technologies that contribute not to the cause but the relief of the current mind and ecology crisis. In the guideline we propose, we seek answers that come from 'the patterns which connect' and which might naturally answer the problems of much other design and life-related fields.

Although 'blue mountains are constantly walking' among us, they can still be hard to climb (Snyder, 2010, pp. 110-111). If we have the telescope or some other poetic media, however, we may get closer to the glimmering stars.

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