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The Collective Intelligence Game:A Project about Collective Learning and Understanding

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A Project about Collective Learning and Understanding
Pierre Lévy on Mar 26 2003   **Levy Project**

Being based on the simple premise that computer technology can be used to enhance the human intellect, Levy's *Collective Intelligence Game* is one of the major contemporary works that brilliantly cultivate the ideas of conceptual precursor Vannevar Bush, Douglas Engelbart and Ted Nelson.

Introduction

Centered on the study and management of the technically augmented collective human intelligence, a new field of research and teaching begins to emerge on an international scale. I speak about a new "field" - and not a discipline - because the unity of the knowledge here pointed out is mainly due to its object - the intellectual cooperation between humans - and does not exclude any information or result originating from the constituted life sciences or social sciences, nor from the practical knowledge making up the managerial, architectural or artistic crafts. The study of the collective intelligence (or, more briefly: CI) constitutes an interdiscipline that aspires to animate a dialogue between human and social sciences as much as with the technical and artistic traditions. Its goal is the understanding and improvement of collective learning and creation process. The emergence of this new field of "research in action" intervenes in the context of a remarkable extension of interactive, collective and decentralized communication practices using and growing a network of increasingly dense and powerful computers. This new communication mode spreads at the same time as international economic relations intensify (globalization), as the economic and organizational structures are shifting (economy of knowledge, virtualization of organizations) and as the new modes of production and communication of cultural signs mutates quickly (digitalization, deterritorialisation, virtual communities). Moreover, it is now widely recognized that free knowledge exchange and intellectual creativity express and foster the health and vitality of cultures, no matter on what scale these cultures are considered: cities or virtual communities, companies and NGOs, regional areas or nations, institutions and international networks of all sorts.

The *theoretical purpose* of the new "science" (it would be necessary to say "art-science" or "culture-science") of collective intelligence is to understand - in the most precise and operational way - the functioning of the human groups engaged in a collaborative activity by means of interconnected computers, or mobile terminals of any kind. Beyond the differences on models and terminology, which distinguish the various thinkers of collective intelligence, the *cognitive approach* seems to best serve as the theoretical unifying element of the new field. According to this conceptual framework, the human communities exert the principal faculties of a cognitive system: perception, memory, reasoning, learning, etc.

As for the *practical and aesthetic stakes* of the CI field, they are linked to teaching and training projects, or to endeavors aiming at the stimulation and improvement of intellectual cooperation. These activities, inspired by the CI principles, may be developed in research networks, groups practicing collaborative learning, companies, on line markets, public administrations, NGO or activist associations, development programs or public health programs, and in virtual communities of all kinds.

The CI perspective implies not only a better comprehension of the processes at work (scientific dimension) or the design of more efficient software tools (technical dimension), it requires above all the cooperative disclosure of esthetical, ethical, political and anthropological opportunities: a deliberate and patient cultural creation. By exploring the new scientific, practical and cultural field of CI, a growing global community in engaged at the cutting edge of innovation in the knowledge society, while promoting worldwide the best values and practices of human development. The goal of this text is to propose a contribution to the foundation of the new field by presenting a particular model of collective intelligence, which takes the form of a complex "game" with data-processing support.

Research in collective intelligence relates to the ecology of ideas

Compared to the hives, the flocks and the packs, speech and other symbolic systems of comparable complexity allowed human communities a leap in collective intelligence. Linguistic symbols created an intricate bond of competitive cooperation stronger and suppler than that unifying the insects of the anthills or the monkeys of the herds of baboons. Articulated language allowed the sudden appearance of entities unknown by animal societies: numbers, gods, laws, works of art, calendars, flows of technical artifacts, and the whole universe of culture. It gave to the human kind the three interlaced powers forming together the creative engine of the cultural evolution: the ability to raise questions, the need to tell stories and the possibility of dialog. Doing so, the language bring out the source of an ever growing stream of evolutionary life forms which self-organized in huge and complex ecosystems. I designate here, under the name of *ideas*, those forms that appear, reproduce and evolve only in the world of culture, in the abstract space of signification opened up by the language.

In setting the *idea* at the center of my model, I chose an approach of the collective human intelligence that radically distinguishes it from other animal societies. In my perspective, the language marks the threshold from which emerge *ecosystems of ideas* - sorts of strange spiritual hypertexts - blossoming in symbiosis with the societies of speaking primates formed by human beings. These ecosystems of ideas grow in complexity, wither, diversify or merge. They lead the societies that nourish and breed them on the diverging path of cultural evolution. Teilhard de Chardin baptized *Noosphere* the world ecosystem of all the ideas. Nowadays, both economic globalization and the growth and convergence of the media culminating in cyberspace help the rest of us to touch the Noosphere with our own fingers. It may be not exactly what we were expecting, but it is there.

Human communities can only survive by maintaining cultures, which are half-closed collective intelligences for the breeding, reproduction and selection of ideas. A company, an institution, a nation, a religion, a political party, a scientific community, a virtual community or a tribe cultivates--*nolens volens*--its ecosystem of ideas. During its existence, a culture explores a sustainable direction of evolution for its ideas. In order to preserve the culture that conserves its existence, a human community have to develop and sustain competences, which are the reproductive and nurturing vital organs our minds offer to the world of ideas. Thanks to the human cognitive faculties, our principal symbionts - symbols - are conceived, reproduced and maintained. Hence, a culture "raises" (above the others) certain human qualities, or competences, which are affinities or familiarities with the ideas of which this culture explores the evolution.

The symbiotic relation between populations and ecosystems of ideas, each one nourishing the life of the other, has significant consequences. Certain populations allow the ideas a better reproduction, especially thanks to writing and other media, thanks also to some institutions and "values" which favor improvement of collective intelligence and unfold the life of the mind. Such populations benefit in return from cultural means giving full meaning to their existence and supporting their demographic performances and their well-being. Ecologies of ideas which offer to their symbiotic populations the best competitive advantages obtain, by this same fact, human resources and techniques which ensure them longevity, abundance and diversity. Conversely, the populations selecting ecosystems of ideas which lead them to weaken or self-destruct themselves, in one way or another, cannot reproduce for long, and thus will not be able to reproduce the ideas ecosystems with which they live. In sum, the process of cultural evolution consists essentially of a mutual selection of the two symbiotic (or symbolizing) "halves": ecologies of ideas and human populations, without fixed point or absolute causal term. A new idea (a new circuit of complex cognitive acts) endures (reproduces) only if its "repercussions" are favorable to the societies of ideas and populations of humans that feed it: the ideas that do not have any positive co-operative consequences are not "viable". Ideas destroying the environment that nourishes them by plundering all its resources without offering anything in return are not "sustainable".

Processes of change, reproduction and selection of ideas obey to multiple and complex rhythms and durations. The influence they have in rebounding on the populations which shelter them are even more difficult to track. The ecological effect of ideas depends *heavily on historical and geographical contexts*. The community of research on collective intelligence has no vocation to make presumed "scientific" (and even less "final") assessments, on how much good or bad is an idea. From the CI point of view, good and bad are not stable and well defined qualities of particular ideas, but contextual effects. An idea is not good or bad "in itself". I would rather say that, *in the circumstances in which it behaves and spreads consequences, according to the particular situation of a complex and context-sensitive ecological system*, an idea supports or disadvantages the culture that sustains it. This is one of the reasons for which I chose the *game model*. A piece, or an idea, in itself is neither good nor bad: it carries powers and opportunities of associations. On the other hand, in the course of a game, it is necessary to assess and hierarchize the values of the possible moves using this piece (this idea). Only *moves* are good or bad.

Historically, the cultural evolution was, in general, oriented by feedbacks coming from the effects (possibly unfavorable) produced by ideas ecosystems upon the human beings sustaining them. But another form of cultural exploration is possible, that which consists in cultivating the ecosystems of ideas consciously and deliberately so that they evolve in the direction of an increased collective intelligence, bringing health, economic prosperity and spiritual refinement to the communities which raise and select them. In all respects the second option is wiser because less expensive and bringing less suffering to the human populations. How to bootstrap such a virtuous circle?

Humanity crossed a significant threshold when it began to tame and breed animals and artificially select vegetable species (livestock farming, agriculture). It traversed other major stages by controlling new forms of energies (industrial revolutions). Today it is confronted with the challenge of the deliberate management of knowledge and its evolution, and that at a rhythm and scale unknown up to this point. The ideas and knowledge constitute from now on "the wealth of nations". The art-science of collective intelligence wants to go along this new phase of the human adventure, helping communities to learn and share their knowledge and wisdom on cultural selection.

Within the metacultural framework outlined here, a deliberate step of collective intelligence consists, for a community, "to cultivate" in an optimal way the ecology of ideas with which it lives in symbiosis and to manage wisely its evolution. This program requires of us a new attention to the *pragmatic* dimension of our ideas: what are their *effects*, here and now, and what are their predictable effects in the long run. It also requires a decisive leap in our ability to take collective and personal distance with our cultural identities. Comparable leaps has already been accomplished with the help of writing, and then with the writing enforcements represented by the alphabet and the printing press. The cyberspace and the new symbolic environment that it fosters could be the following step. The development of testable and operational digital models of collective intelligence is a means (among many others) for this end. The CI game suggested here wants to exert the most curious minds with a dynamic ideography, an interactive modeling tool of the cultural ecosystems. The highest claim of this software would be to offer a mirror of their collective intelligence to the communities who will decide to use it.

To exploit the new means of communication

Just as the printing press had transformed the practice of the clerks and of the scientists, Internet changes the way the community of researchers is coordinated... and has not finished doing so. This shift - far from being opposed to it - prolongs the several centuries old ideals of the Republic of Letters, which consists in sharing knowledge and to organize the dialogue between creators. The Internet has existed only for thirty years and the Grand Hypertext for ten years. It is thus difficult for us to envisage the transformations to come in the long run. Nevertheless, some trends are already visible. Let us quote three of them.

1) One of the most significant is undoubtedly the real time sharing of archives and primary data. Once digitized, the databases, the files and the sources of information are at immediate and direct disposal everywhere there is a connection to the network. In the same way, works whose matter is digital (music, images, texts, software, simulated worlds...), are in theory virtually omnipresent on the Internet.

2) The "publication" rules are redefined. The new observations and theories can be made public without passing through the traditional scientific channels (journals, conferences). The artists can "expose" or publish while jumping over the advice of galleries, museums, recording houses, editors, etc. The consequence of this publishing revolution is twofold. On the one hand, the circulation of new ideas is much faster. On the other hand, their assessment is now made a *posteriori* through on line voting, ratings, quotations, comments and references. The evaluation is also accomplished more quickly.

3) Vast "virtual teams" dispersed geographically and institutionally, can associate and work on the same objects in close collaboration. For those that would fear the "disappearance of the body" or "insulation in front of the screen" let us recall that all these phenomena, as everybody can experience, is generally correlated with a multiplication of the travels, conferences and physical contacts.

In the 21st century, to lay the ground for a new field of research and practice implies the best possible exploitation of the cyberspace and the related computer based intellectual technologies. In particular, we could both use and encourage the three evolutionary tracks mentioned previously. For example, one can consider the possibility of establishing, not only an online journal, but also a portal and an interconnected "blogging" virtual community that would become the rallying virtual center, the meeting place of the new knowledge field. Moreover, one can also plan that free software will be used to crystallize, to share and make evolve the models which are the topics of discussions and experiments. The members of the CI research network could then detect failures and deficiencies, and propose improvements or changes concerning the software that incorporates the models, exactly as programmers dispersed in the world evolve the free software from release to release and put together new modules for new functions. For this reason, I propose here a particular model of CI, model that would be implemented, in the years to come, by an international research network in the form of open source software.

A free software: The Collective Intelligence Game

To make the Collective Intelligence Game a fruitful object of knowledge, it seems useful to make it visible through symbolic images. There is indeed a link that has often been underlined between the development of a science and that of its instruments of observation, visualization and representation. The telescope, the microscope, the cartography and the new medical imagery illustrate this relation in an obvious way. Moreover, the great periods of cultural invention often wove a strong relation between drawing, "space setting" and thought. One can, on this subject, evoke the ideographic writings that governed the blossoming of Egyptian and Chinese civilizations, the role of geometry in the traditional Greek culture and that of the geometrical perspective at the time of the Renaissance. All these periods of cultural accomplishment also cultivated remarkable forms of city planning, architecture and monumentality. In the XXIst century, the image calculated by computer seems to initiate a new dialectic between space, vision and reason. Innumerable scientific disciplines use digital images in order to visualize their data. In the industry, computerized graphic simulations assist the design and management of complex processes. Finally, the bond between virtual architecture, town planning and virtual worlds, already initiated, will be tied in an increasingly close way in the future.

The traditional observation instruments opened the access to the infinite, the far, the immense and the hidden. Today, data processing makes it possible to transform huge amount of digital data into images, virtual universes to be browsed, thus opening the access to the indirect vision of the very complex and the abstract. Let's make the hypothesis that the *semantic space* (the universe of information, interests, knowledge and competences) is called to become *the structuring space* compared to other more concrete spaces. It is thus quite naturally that we should consider the design of software calculating - starting from empirical data flowing from the real communities - visual representations of the collective intelligences, including their conditions of development and their environment. These representations should be readable and explorable in order to help the people and the groups to orient themselves in the abstract (but nevertheless extremely influential) space, on which all will depend more and more.

The research network to which I participate is planning to program such a piece of software. This *Collective Intelligence Game* (CIG) will help to gather, translate and format relevant data. Out of this data, it will provide visual modeling and interactive simulation of cultural ecosystems, returning to the concerned communities a reflexive image of their collective intelligence. This image will provide indications on the problems to be solved, since the form of a collective intelligence is in close connection with that of its landscape of problems. Il will also assist the communities in managing and improving their modes of intellectual cooperation and their cognitive performances. Among all the factors that enter its composition, the model suggested below grants a significant weight to *reflexivity*, i.e. to information and ideas (organized in a consistent way) relating to the community considered as a cognitive system. The programming of the CIG and its free access on the Internet intends to contribute to a better "self-knowledge" of the communities. Of course, this effect will be limited to the communities who firmly commit themselves into the path of cognitive self-transformation, which requires some courage. For the individuals, this interactive ideography - specially designed to describe and manage cultural ecosystems - should support the *training of strategic thinking* adapted to a complex global knowledge society. The use of this software would follow the following stages:

> **1) Gathering of the data concerning the knowledge economy of a community (to take "stock");**

> **2) Feeding the model with data to get a map of the collective intelligence structure of the community (to carry its position on the "chart");**

> **3) Starting from this position, the CIG will simulate evolutionary scenarios about the ideas ecosystem of the community. These simulations will give relevant indications on the course to be followed in order to progress - in each different situation - towards an increase in collective intelligence (the "compass" shows "North"), while avoiding the reefs of imbalance and unsustainability.**

[part 2 comming around April 20]

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