Bibliography: Bibliography for the Collective Intelligence Game

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Bibliography

Bibliography for the Collective Intelligence Game

Pierre Lévy on Apr 1 2003

Levy Project

One will find in this document...

1) A general presentation of the scientific context of "The Collective Intelligence Game": my own work and those related to the emerging transdisciplinary field of Collective Intelligence. 2) An annotated bibliographical selection 3) An extensive bibliography

-Pierre Lévy

Scientific Context

A natural sequence of already continued work

The project of Collective Intelligence Game prolongs much of my previous work.

In my 1991 book, The Dynamic Ideography (L'Idéographie dynamique) which studied the role of the visual representations in thinking (Denis), I had initiated a work on the new possibilities of iconic and interactive writing on computer screens, able to represent the mental models rather than the sounds (Johnson-Laird) and to make the complex phenomena and the abstract structures visible (Tufte). The Collective Intelligence Game continues and supplements this line of research. It will also be for me the occasion to continue to explore the knowledge engineering processes (see my work of 1992, Computer Programming Considered as a Fine Art - De la Programmation considérée comme un des Beau-Arts).

My other 1992 book, The Trees of Knowledge (Les Arbres de connaissances, in collaboration with Michel Authier), described a digital system, based on a dynamic mapping of "the knowledge space" of human groups, for the communication between individuals, trainers and employers. Making visible the know-how of communities, the trees of knowledge help to design regional development strategies, to control trainings and formations and to manage the human resources of companies, while recognizing the diversity of competences of people and empowering learners. This collective intelligence booster was actually programmed and marketed by the company Trivium...
SA, still active, which I helped to found in 1992 (see for example: www.globenet.org/arbor). The Knowledge Tree is recognized as a pioneer software in the field of knowledge management.

In addition to my work related to the design and use of technical tools for the support of collective intelligence, I have worked for many years on a general theory. In my 1990 book The Technologies of Intelligence. The Future of Thought in the Digital Era (Les Technologies de l'Intelligence. Le futur de la pensée à l'ère informatique), I announced the global interconnection of computers, the generalization of hypertext and I provided the theoretical foundations for what I then called the "cognitive ecology", four years before the public outburst of the Web. Thereafter, the majority of my theoretical works looked further into the concept of collective intelligence in various fields such as epistemology, economics and politics (see Collective Intelligence in 1994, Becoming Virtual (Qu'est-ce que le virtuel?) in 1995, Cyberculture in 1997, World Philosophy in 2000, Cyberdemocracy - Cyberdémocratie - in 2002).

A research theme in expansion

Beyond my own work, many researches have focused on collective intelligence in the last forty years, with a remarkable increase in the last ten years; this increase was due to the development of the Internet and to the growing importance of the economy of knowledge. Even if names differ, a common object seems to emerge: Noosphere of Teilhard de Chardin, Ecology of Mind of Gregory Bateson, Ecology of Representations of Dan Sperber, Collective Subject of Michel Serres, the Cybiont or symbiotic man of Joel de Rosnay, the Hive Mind of Kevin Kelly, the Connective Intelligence of Derrick de Kerckhove, the Super Brain of Francis Heylighen, the Global Brain of H. Bloom, the Emergent Intelligence of Steven Johnson, etc.

Biology

Furthermore studies on human collective intelligence are nourished by a great number of disciplines and research fields. The following paragraphs can only give us a faint idea of what has been done so far. A fruitful biological philosophy, often near to a radical constructivist epistemology (von Foerster), did much to bring the concept of self organized complex communication systems closer to the concept of cognitive system: research on cellular death (Ameisen), on biological organization and theory of information (Atlan), on the autopoiesis and autonomy of living systems (Maturana, Varela), or on organisms considered as evolving ecosystems (Kupiec & Sonigo). Sociobiology, through studying the phenomena of communication and collective intelligence in animal societies (Wilson), and in particular in the societies of apes (Cheney & Seyfarth), informs us about the biological basis of human collective intelligence.

Philosophy, anthropology, history

In counterpoint, the philosophical, evolutionary and cognitive approaches of language help us to understand why human collective intelligence belongs to another order than that of animal collective intelligence (Austin, Bickerton, Deacon, Jackendoff, Mithen, Pinker, Vygotsky, Wittgenstein). Philosophy and anthropology teach us how techniques are constitutive of a collective intelligence of humanity that goes through a constant transformation (Deleuze and Guattari, Leroi-Gourhan, Simondon, Stiegler). Since the works of Innis and McLuhan, significant historical (Eisenstein) and anthropological (Goody) studies were devoted to the cultural metamorphosis related to the changes of communication systems. Let us mention in particular the birth of the "mediologic" field under the impulse of Régis Debray in France.

Economy and knowledge management

The growing proximity of different trends in economic and management sciences is a clear sign of a polarization towards the issue of collective intelligence: the emergence of the knowledge economy (Hayek, Machlup, Porat, Simon), a new insistence on the role of social capital (trust and quality of social bonds) as a foundation of prosperity (Fukuyama, Putnam), the growing popularity of knowledge management and of different theories on learning organization since fifteen years (Senge, Stewart and innumerable authors, like Morey, D., Maybury, Mr. & Thuraisingham, B. or Levin, R., Locke, C, Searls, D., Weinberger, D. for a less conventional approach).

Sociology, Sociology of sciences

The incipient sociology of the virtual and of the Internet (Jones, Gauntlet, Bell), the sociology of networks (Scott, Degenne & Forsé, Wellman), the success of the theories of the information society (Castells), the theory of society as a closed self-organizing system (Luhman), the recent approaches of cultural evolution in terms of complex
ecologies of representations, ideas or "memes" (Dawkins, Sperber, Dennett), bring equally their contribution to the understanding of collective intelligence phenomena. Some recent developments of sociology and history of sciences (Callon, Latour, Stengers), explaining the effective processes of producing knowledge in the scientific community, give us precious indications on the mechanisms of collective intelligence on a key ground.

Network art and cognitive sciences

The new artistic forms with digital support, notably those which are based on sampling, set in online systems or devoted to interactions in virtual worlds, support indeed new forms of cooperativeness and, at the same time they symbolize the emergence of an explicit culture of collective intelligence (Ascott, Balpe, Packer & Jordan).

Last but not least, cognitive sciences themselves increasingly focus on the study of the cognitive properties emerging from collective phenomena. The "society of mind" described by Minsky, the parallel distributed processing model of intelligence (McLelland), the neural darwinism (Edelman), the distributed intelligence in robotics (Brooks), the multi-agent systems, the simulations of "artificial life" halfway between cognitive sciences, theoretical ecology and the theory of evolution (Langston)... all these approaches have in common the growth of cognitive characteristics from social or ecological processes.

Starting a tradition of research

Despite the number and the success of publications concerning the theme of collective intelligence, still it is not possible to speak of a scientific field. The time has come to go beyond brilliant works and suggestive metaphors in order to start a real tradition of scientific research about this issue, along with a particular stress on technically increased intelligence of human communities.

The constitution of collective intelligence as scientific object, that is our general aim, can be divided into three particular related objectives:

1) proposing a scientific theory of collective intelligence,
2) elaborating a methodology for collecting and processing data,
3) constituting a community of international and multidisciplinary research.

In the official request (presented in autumn 2001) that allowed me to get the Canada Research Chair on collective intelligence at the University of Ottawa, I wrote: "Our theoretical work will concern the construction of a causal model of collective intelligence. The elements of this model and the relations between these elements will have to be, as far as possible, measurable and in any case precisely observable by researchers studying phenomena of collective intelligence on different grounds. Moreover, such a model will have to work as an observation scheme. The construction of an explicative causal (consequently operative), general (abstract) and verifiable model of human collective intelligence phenomena aims at reaching the following objectives: 1) obtaining observations coming from different grounds for the construction of a corpus of coherent knowledge, capable to increase and therefore to lay the basis for a real field of scientific research; 2) allowing observers to constantly improve and modify the model; 3) allowing different communities to use the results of this new research field in order to improve their processes of collective intelligence in an operating way".

See: 0-researchabstract.doc

Below, one will find a bibliographical selection with commentary, followed by an extensive bibliography.

Bibliographical selection with accompanying notes on collective intelligence in the era of cyberculture


A good introduction to the approach of cultural phenomena in "darwinian" terms. In the cultural sphere, according to a suggestion of Richard Dawkins, the gene is replaced by the "meme", from whence the term "memetics". How do ideas reproduce and which type of ecology do they form?

Bateson is a multi-field researcher who began his career as an anthropologist, fell in love with the cybernetic ideas at the end of the Forties and remained interested throughout his life in the processes of communication and thought, viewed from a systemic and ecological point of view. One of the fathers of the concept of collective intelligence.

Bloom, H., Global Brain. The Evolution of Mass Mind from the Big Bang to the 21st Century, John Willey and Sons, NY-Toronto, 2000
From the biosphere to cyberspace, passing through social and cultural systems, complex evolutionary phenomena are considered by Bloom as cognitive processes.

Three volumes of almost 400 pages each, full with statistics and facts, on the new networked society and the information era. The approach is mainly sociological.

A report ordered by the United Nations to overcome the problems of the digital divide and to move forward development opportunities thanks to the new digital medias. An impassioned strategic approach, with many concrete examples and hyperlinks.

Hayek, F. The Use of Knowledge in Society, American Economic Review, XXXV, No. 4; September, 1945, 519-30. HayekUseOfKnowledge.html
One of the first texts in which the father of contemporary liberalism analyzes the market as a kind of self-organizing cognitive system, allowing actors armed with very incomplete information and with divergent objectives to make the best possible use of supplies at hand. The prices are considered as emerging signals, which inspire a non-centralized coordination.

Heylighen, F. & alii, Principia Cybernetica Web (http://pespmc1.vub.ac.be/DEFAULT.html)
A collective interactive work animated by Francis Heyligen on the Web. Principia cybernetica uses the theories of evolution and complex systems to describe the progressive emergence of a "global brain" or a superorganism which is increasingly structured by the Internet.

A biological, ecological and evolutionist approach to social phenomena. The hive mind is much more intelligent than that of the bee and the development of the telecommunications networks makes our human hives more complex and more creative.

Kerckhove (de), D., Connected Intelligence, Somerville House, Toronto, 1997 (French translation: L'intelligence des réseaux, Odile Jacob, 2000)
An enthusiastic vision of the new civilization based on the interactive communication networks by the successor of Marshall McLuhan at the University of Toronto.

On line : http://www.cluetrain.com/
A renewed approach of management, marketing and public relations which fully integrates the Web revolution and the electronic mail. The authors expose their theory of the market regarded as a network of conversations (on line and in real time) in which consumers and salesmen belong to the same interdependent community.

Lévy, P., Les technologies de l'intelligence. L'avenir de la pensée à l'ère informatique, La Découverte, Paris, 1990
This book describes the interconnection of computers and announces the importance of hypertext 4 years before the emergence of the Web. The computer is analysed as a support for intellectual technologies transforming the cognitive ecology of our societies.

The Book describe the project of a civilization of collective intelligence which would fully utilize the best potentialities of cyberspace. First published in 1994, the same year as the public growth of the Web.

Lévy, P. Becoming Virtual, Plenum, NY, (Original french version Qu’est-ce que le virtuel? La Découverte, Paris, 1995)
A philosophical reflection on the contemporary changes of the body, the text and the
The book shows that the phenomenon of virtualization was constitutive of the human kind from the beginning in its three basic dimensions: language, technology and complex social institutions.

Lévy, P., Cyberculture, Odile Jacob, Paris, 1997
A presentation of the new emerging culture from a humanistic prospect... and an attempt to respond to the doubts and fears which opposes to the cyberculture.

Lévy, P., World Philosophie: le marché, le cyberspace, la conscience, Odile Jacob, Paris, 2000
A positive vision (despite everything!) of the extension of cyberspace, which is placed in the perspective of a multi-secular process of unification and expansion of humanity consciousness.

Lévy, P., Cyberdémocratie: Essai de philosophie politique, Odile Jacob, Paris, 2002
This book describes the transformation of the world public sphere due to the growth of the Internet and the first steps of the E-government. The investigation is prolonged by a project of global cyberdemocracy using all the resources of the Net. Hundreds of hypertextual links concerning the political life on the Internet exemplify the theory. The links online: http://www.odilejacob.fr/indexcyber.asp

Lévy, P., onlinel, A list of hyperlinks about collective intelligence in the cyberspace: liensIC.html

A basic text, which foresaw in the advent of the electronic extension of the nervous system of man, the beginning of a world consciousness. McLuhan taught us how to interpret cultural evolution according to the history of media.

Packer, R., Jordan, K., Multimedia, from Wagner to Virtual Reality, Norton, NY, 2001
A collection of the main "historical" texts of the thinkers and visionaries of multimedia and the Internet.

A first hand analysis of one of the most significant sociological phenomenon, since the end of the eighties: the emergence of virtual communities.

A fascinating and scientifically well informed vision of the human superorganism in the process of constitution by interactive communication networks.

The author, Jesuit paleontologist and mystic, was one of the first to reconcile faith and evolutionary reason with such force. He conceives evolution like a continuous and infinite ascent towards more complexity and conscience, i.e. towards God. The constitution of an increasingly inter-connected and co-operating humanity thanks to the progress of science, technique, and the media was the grand vision of a philosopher considered today as "Patron Saint" of the Network. Teilhard de Chardin has baptized "noosphere" the ecology of mind that prolongs and envelopes the biosphere as a growing spiritual stratum.

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