

Interview with Pierre A. Lévy, French philosopher of collective intelligence

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Pierre A. Lévy is Professor in the Department of Communication, University of Ottawa, Canada. He occupies the Canada Research Chair in Collective Intelligence where he is engaged in research on the design of a universal system for semantic addressing of digital documents. He completed his MA at the Sorbonne and his PhD at Ecole des Hautes Etudes en Sciences Sociales (EHESS), Paris. His Habilitation (PhD) was in sciences of information and communication at the Université de Grenoble. Professor Levy studies the concept of collective intelligence and knowledge-based societies. He is a world-leading thinker on ‘cyberculture’ and the author of many books, including *L’intelligence collective* (1994), *Qu’est-ce que le virtuel?* (1995), *Cyberculture* (1997), *World Philosophie* (2000), *Cyberdémocratie* (2002), *La sphère sémantique* (2011), *The Semantic Sphere* (2011) (Photo: <http://arts.uottawa.ca/communication/en/people/levy-pierre>).

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‘Collective intelligence’ is defined as the capacity of human communities to cooperate intellectually in creation, innovation and invention. As our society becomes more and more knowledge-dependent, this collective ability becomes of fundamental importance. It is therefore vital to understand, among other things, how collective intelligence processes can be expanded by digital networks. It is one of the keys to success for modern societies.

Pierre Lévy is one of the world’s leading thinkers, not only in the vast area of cyberculture, but also in the fundamental field of knowledge and its processes. He was essentially the first to focus research on collective intelligence when it became a determining factor in the competitiveness, creativity and human development of knowledge-based societies.

Related websites:

- http://en.wikipedia.org/wiki/Pierre_L%C3%A9vy
- <http://pierrelevyblog.com/>
- <http://pierrelevyblog.com/my-research-in-a-nutshell/>
- <http://www.amazon.com/Collective-Intelligence-Mankinds-Emerging-Cyberspace/dp/0738202614>

Michael Peters (MP): May I call you ‘Pierre’? Can you tell us something about your education, especially over the three institutions of your experience as a graduate? What were the strong influences from this period in terms of philosophers and philosophy?

Pierre Lévy (PL): Yes you may (and I will call you Michael). During the second half of the 1970s, I studied History at the Sorbonne in Paris, where I received a strong influence from the French school of history called *L’École des Annales*. These historians were interested in long-term trends, quantitative and anthropological history (as opposed to biographies, diplomacy and military history). But I was already reading a lot of philosophy for myself, mainly the classics, with a particular interest in epistemology. So, I was delighted to discover that one of my favorite contemporary French philosophers, Michel Serres, was teaching in history (of science) at the Sorbonne. I followed his courses first as a regular student and then as a free follower during almost 15 years. I did my master’s thesis on *Communication, knowledge and teaching in the computer age* (1979) under his ‘supervision’ (I use the quotation mark because he left me completely free) and I became one of his collaborators for several projects (books, report for the French government, etc.). I liked his encyclopedic knowledge of hard sciences and the way he connected humanities and natural sciences through information theory and structural isomorphisms. Bruno Latour and Isabelle Stengers were some of the main scholars in his circle.

My second master in philosophy was Cornelius Castoriadis, who was teaching at the EHESS and ‘supervised’ my PhD thesis on *The Idea of Liberty in Ancient Greece*. I chose this subject in order to improve my knowledge of the classics and also because the notion of free will has always been an enigma to me. So I wanted to know how this idea was problematized at the beginning of the philosophical tradition. Here again, I was left without any other guidance than what I learned from Castoriadis seminars at the EHESS, which I followed during several years, even after having finished my PhD. Castoriadis was a psychoanalyst, a (post-Marxist) economist and a philosopher. His thinking revolved around the idea of historical creation: the surprising emergence of new natural or cultural *forms* that could not be deduced from previous facts and logical thinking. There is a ‘magmatic’ quality in being that traditional rationality cannot grasp. During the time when I followed his seminar, he was revisiting the emergence of philosophy and democracy in ancient Greece (by the way, he was a Greek himself). The Greek miracle was precisely an example of the creative historical imagination that he was trying to understand.

Trying to list all my influences would be futile, I remember Foucault, Edgar Morin, Jean-François Lyotard, Baudrillard ... all people that I met personally, following their seminars, discussing with them in conferences. My biggest influences in addition to Serres and Castoriadis were certainly Deleuze and Guattari. I have read all their books,

either written by one of them or by both. Their common masterpiece is certainly *Mille Plateaux* that had a huge influence on me. I had a small correspondence with Deleuze about my books on collective intelligence and the virtual. He liked the fact that I used their concepts 'while giving them other determinations'. I developed also a friendship with Guattari during his last years. He was a deeply original thinker that encouraged me into free enquiry and disregard for academic consensual intellectual conservatism (that often disguise itself under the mask of progressism).

Through the research group on 'the origin of self-organization theories', gathered by Jean-Pierre Dupuy around his laboratory at the Polytechnic School in Paris, I came to know Fransisco Varela, Henri Atlan, and even Heinz von Foerster (who was still living at the time) without forgetting the diverse trends of American cognitive sciences, who's leaders were often invited in France ...

MP: I must say that your educational background is a very rich environment for pursuing a philosophy of technology: Serres, Castoriadis, Deleuze and Guattari. Already I can see the significance of your early engagement with information and communication theory through the lens of these thinkers. (It gives it an historical and philosophical intonation that seems characteristic of your work.) Can you describe for us the moment when you first conceptualized the notion of 'collective intelligence' within a digital setting? When did you first come across this idea and when did you realize that it was a seminal concept that could carry all the weight you wanted to place on it? I am asking for a brief sketch of the history of your engagement with the concept.

PL: First, I should give a brief definition of collective intelligence. It is a scientific, technical and political project that aims to make people smarter with computers, instead of trying to make computers smarter than people. So, *collective intelligence* is neither the opposite of collective stupidity nor the opposite of individual intelligence. It is the opposite of *artificial intelligence*. It is a way to grow a renewed human/cultural cognitive system by exploiting our increasing computing power and our ubiquitous memory.

I discovered progressively the many layers and connections of this idea as I pursued my theoretical investigation on humanities and computing in my books *La Machine Univers* (1987), *Les technologies de l'intelligence* (1990) and *L'idéographie dynamique* (1991). But the idea came also from my field studies and my practical experience in software design and education reform. These experiences are described in my books *De la programmation considérée comme un des beaux-arts* (1992) and *Les arbres de connaissances* (1992).

Let's begin with the theoretical investigation. In *La Machine Univers*, I wanted to show that computing does not come from another planet but has deep cultural connections in the Western scientific and philosophical tradition and also in the contemporary esthetic and epistemologic mindset. The birth of automatic computing in the middle of the twentieth century was the result of a long cultural enterprise to formalize and augment human intellectual operations. I verified by myself during this work the parallel course of mathematics, technology, art and other cultural forms that Michel Serres was pointing out in his teachings. In *Les Technologies de l'Intelligence*, inspired by the concept of intellectual technologies of Jack Goody, I forged the notion of 'cognitive ecosystem'. I described the new cognitive ecosystem that could emerge from automatic computing and

telecommunications. I forecasted the growth of collaborative environments and the generalization of hypertexts (it was before the Web!). Finally, *L'ideographie dynamique* summarizes a reflection on languages and semiotic systems and their role in cognition. What could be the dynamic interactive writing system of the twenty-first century? What writing system will be invented *after* the establishment of the algorithmic medium?

I would not have discovered the concept of *digital based collective intelligence* without two important practical experiences. First, I was involved during the late 1980s and the early 1990s in several projects of 'expert systems', where I practiced knowledge engineering and studied in several fields the formalization of knowledge and its transformation into data and algorithms. I realized that what was called 'artificial intelligence' at the time was in fact a very powerful medium to share and mobilize human knowledge. This is explained in *De la programmation considérée comme un des beaux-arts*. Second, I participated to a [French] government think tank working on educational reform. Our team came with the utopian project of an open knowledge space emerging from the learning paths of the real people instead of an *a priori* hierarchy of prerequisites. And the only way to map such an open dynamic contextual emerging knowledge space was through software and telecommunications (again, this was in 1991 and 1992, which means before the Web). Needless to say, the government refused our proposal ...

The concept of a new personal/collective cognitive system based on cyberspace finally crystallized when I studied *The Guide for the Perplexed* by Maïmonides in 1993 and, more generally, the whole aristotelian and neoplatonic tradition centered on the active intellect. This was 'the moment'. The medieval philosophers (Muslims, Jews and Christians alike) had meditated during centuries on an entity at the interface of the transcendent and the immanent. This interface—the active intellect—encompassed the whole of human intelligence! I just had to reverse the top-down fall of intellectual light from the heights of the divine onto humanity. In the new algorithmic medium, collective intelligence would emerge bottom-up from the multitude of actual human knowledge.

MP: I like this formulation: 'people smarter with computers rather than computers smarter than people' because it gives imparts a politics of agency and also seems on a par with segmented intelligence. I also now understand the 'deep cultural roots' in the Western philosophical tradition of computing to 'to formalize and augment human intellectual operations'—from Aristotle's syllogisms, and Leibniz's calculating machines to Berners-Lee's 'social machines'. In the paragraph that mentions Jack Goody and Michel Serres you mention aspects of your developing theoretical approach: the concept of the cognitive ecosystem, 'the growth of collaborative environments and the generalization of hypertexts', and the role of language and semiotics in cognition, leading to the concept of *digital based collective intelligence*. In this connection you ask the question: 'What writing system will be invented *after* the establishment of the algorithmic medium?' Can I ask you to reflect further on this question for our readers especially on the definition and significance of algorithms?

PL: The emerging medium has interesting features. It makes the whole mass of human symbols ubiquitous, interconnected and automatically transformable. The algorithms are the abstract robots that fetch, translate, and modify information for us. An algorithm

is a series of instructions to an automatic computer. It is an abstract structure that can be expressed in many different programming languages. Algorithms give the new medium its distinct character (automation of transformation), as compared to mass media (automation of copy) or static writing (self conservation). The majority of our symbolic systems are inherited from the age of static writing and mass media. Hyperlinked social media and videogames are the forerunners of the symbolic revolution ahead. The next generation of writing systems will help us to filter, categorize, evaluate, analyze, visualize and generate flows of data. They will have the power of programming languages and the nuances of natural languages.

MP: In a condensed last paragraph you touch on Maïmonides and the ‘active intellect’. Can I ask you to elaborate for us?

PL: In his *Metaphysics* Aristotle defines the divinity as ‘thought thinking itself’. This supreme self-reflexive thought was for him the ‘prime mover’ that inspires the eternal movement of the cosmos. In *De Anima*, his book on psychology and the theory of knowledge, he states that, under the effect of an active intellect separate from the body, the passive intellect of the individual receives intelligible forms, a little like the way the senses receive sensory forms. Starting from the enigmatic propositions of Aristotle’s theology and psychology, a whole lineage of Peripatetic and Neo-Platonic philosophers—first ‘pagans’, then Muslims, Jews and Christians—developed the discipline of noetics, which speculates on the divine intelligence and its relation to human. Our theosophists imagined a series of mediations between the transcendent knowledge of God and the partial and transitory knowledge of Man. At the lower end of a series of skies (or ‘angels’), the active intellect provides communication between the celestial worlds emanating from god and mortal humanity dispersed in time and space. The *active intellect* sends to humans the intelligible categories that inform their passive intellect, but each one of them receive only a small part of it. So the medieval philosophers had already thought the *actual living unity of human knowledge*, despite our scattering in space and time. I think that we should keep this idea, except that the all encompassing living unity of knowledge should be conceptualized as emerging socially and technically from human multitudes via the new algorithmic medium. Instead of an active intellect broadcasting its forms from God, we will have an emerging virtual world of ideas that will be accessible to all.

MP: In terms of the biological realm now routinely scientists talk of ‘swarm intelligence’ and ‘social insects’, ‘flocks’, ‘schools’, that seem to imply a mammalian basis for collective intelligence also. Can I anticipate you by asking about the evolutionary development of collective intelligence and what it might evolve?

PL: Of course, collective intelligence is a property of animal societies. Human collective intelligence is itself rooted in the collective intelligence of societies of apes. Ethological studies on ape societies gives us many indications on this topic. The first specifically *human* collective intelligence was probably organized around the mastering of the fire, one or two millions years ago. The real take off of human collective intelligence followed

the development of language, tools and complex institutions 200,000 years ago. Human beings are symbol manipulators, and they do it collectively. After the development of language, each new medium expended further the cognitive power of our species: more and more elaborate writing systems, mechanical then electronic mass media and finally computing

Distribution and increase of computing power will lead to the democratization of algorithm creation and data analysis. In cognitive terms, the direction of this evolution is an augmentation of reflexivity. Complete transparency is probably impossible, and not even desirable. But we will be more aware of the available knowledge, of its human sources, of the networks of relations between people and people, people and ideas, ideas and ideas. We will be able to *observe* our collective cognitive processes and to understand more precisely how we think and act together. I foresee for the next centuries an epistemic revolution in the human sciences that will dwarf the revolution of natural sciences that took place between the seventeenth and twentieth centuries. The spiritual, esthetic, political and economic consequences of this growth of reflexive collective intelligence cannot even be imagined today.

MP: I would like to pick up on the evolution of writing systems from alphabetic and scribal to mechanical, and from mechanical to electronic, and finally into the stage of computing. Why do you focus on writing systems as an index of evolutionary development of collective intelligence, rather than say speech or language?

PL: Because the ability to speak is innate in the human being. It is part of the brain that every one of us has at his (or her) birth. We have the same brain than our *Homo Sapiens* ancestors back in 200,000 BCE and exactly the same linguistic competence. Of course natural languages are conventional, but children know naturally how to speak when they are exposed to language. The most ‘primitive’ societies in terms of technology or political institutions use languages that are as complex as the languages of the most ‘advanced’ societies. By contrast, writing systems were invented rather late (around 3000 BCE) and were progressively improved during the rest of human history. Writing systems are not acquired spontaneously but learned at school and, until the invention of the alphabet, it was a specialized professional skill. Based on our innate or natural ability to manipulate symbols (language), the cognitive part of cultural evolution (writing systems and media) augments our personal and collective memory, our means to access this memory and our ability to exploit it.

MP: What are the epistemological characteristics of computer-based writing systems? I think you have already given us some substantial hints concerning its algorithmic nature. I’m not entirely clear what is a computer-based writing system? I am wondering whether you might say a little more about this and its implications for education?

PL: Basically, computer-based writing systems allow you to give orders to a dynamic symbolic environment. The simplest example is the ‘like’ on Facebook. By ‘liking’, you command some algorithms that control your news feed: the kind of information that will be sent to you, the people from whom you’ll receive news, etc. Hypertextuality is

another example: by clicking, you command the next display of a database. Programming languages are currently the most powerful of these computer-based writing systems because they give you total control on computers. But they are difficult to learn and they correspond to a specialized professional skill rather than to a general cognitive empowerment of the population. It should be clear that computer-based writing systems are currently in their infancy. In the future, we will be able to enrich the collective memory on line and to control what we receive from it in a much more precise way and without being obliged to master a specialized professional skill. From an educational point of view, 'learning to write' in the algorithmic medium means something different than 'learning to write' in a typographic medium. It implies not only building a visual sequence of characters (or images) in order to make sense directly for other human fellows, but also sending commands to complex algorithmic systems in order to augment and transform collaboratively a common memory. We should begin to tackle this new educational challenge.

MP: I am guessing that e-writing and e-reading are part of the new algorithmic environment that embraces a new immateriality of texts and images that provide collective experiences along the whole spectrum from consciousness, awareness, and intelligence to collective responsibility and action within dynamic symbolic environments. I wonder about a number of aspects that I hope I can get you to speculate about: (i) the diversity of thought within these dynamic environments (and resistance), and the related notion of technological convergence and singularity; (ii) the shift from text to (moving) images; (iii) the related shift to mobile ubiquity.

PL: The Internet has given a big boost to freedom of expression because people can post what they want in their blogs or in social media for free and without being obliged to get the approval of publishers or editors in chief. In addition, we are able to watch and read everything that is published on line, whatever the countries and cultures of the authors (if we know the languages, of course). The immediate consequence is an augmentation of the available diversity of information and ideas. Now the problem is to promote an education that will help people to make a competent and responsible use of all this diversity. The risk of being locked in an 'information bubble' because of algorithms that give you more of the same and confirm your prejudices is real. There is no other solution than (a) an open and exploratory online behavior and (b) an effective exercise of personal thinking. Call this 'resistance' if you want.

About the singularity (in a Kurzweilian sense) I don't believe that algorithms will evolve by themselves and even less that 'robots will take power'. Let's not reify the technology. Algorithms are the extensions of the human symbolic faculty and in no way an autonomous power.

I don't see a real shift from text to moving image but rather a powerful growth of both toward interactivity, generativity and hypertextuality. It would be useful to consider the 'text' in its very general sense of symbolic arrangement, including image, music, etc. From the fifteenth century to the twenty-first century the text has evolved in the direction of ubiquity, portability, movement and automation.

MP: Another question where does politics figure in the evolution of writing and especially in its new forms in the algorithmic environment?

PL: This is an immense question. I can give you only some brief indications. The scribal writing systems were adapted to Palace-Temple power structures, like in the Pharaonic, old Mesopotamian or pre-Confucian China. The literate writing systems (alphabetic or post-Confucian Chinese ideography) were the tools of ‘universal’ empires including networks of cities, money, big bureaucracies, etc. Think of Persian, Greek, Roman, Arabic or Chinese empires. The printing press and the unidirectional electronic media supported the invention and the development of the nation state between 1450 and 2000. The new political power structures based on the algorithmic medium are still to come, but we can already guess what they will look like. Their actual part will be networks of ‘smart’ metropolis where people, sensors and robots will exchange information constantly. Their virtual part will consist in the collective intelligence of their population. Let’s call this new power structure the *swarm-state*. There will be political and military struggles between these intertwined swarm-states for regional and global dominance. We can also predict internal conflicts where political parties will be aligned on epistemological positions. Social domination will be a function of cognitive speed and exploitation of memory ...

MP: Pierre, thank you.