Collective Intelligence

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INTRODUCTION

Intelligence is taken here as the ability for attaining goals or for solving problems that put at work responsiveness of the solver to the situation where the goal or problem arises and use of its previous knowledge and experience. Let one notice that this definition means that intelligence or intelligent behavior is not an absolute concept in at least three ways:

- Intelligence is relative to the goal or problem being solved.
- Intelligence is relative to the situation where the goal arises.
- Intelligence is relative to the knowledge and experience of the solver.

Usually, intelligence is conceived as a property of individuals. In recent years, the recognizance has grown that this conception is too narrow. It makes sense and it is most useful to consider the intelligence of groups of individuals, whether small or very large. Such intelligence is still the intelligence of one entity—the group—but it is made of the ways individual intelligences are orchestrated or coordinate themselves. This being given, collective intelligence (CI) is defined here simply as the intelligence of entities constituted by several or many individuals. As taken, CI is about the intelligent behavior of entities which are conceived from the beginning as not being atomic.

This definition requires that its field of application in this entry be made precise. Virtually, any entity may be conceived as not atomic. If so, any intelligence would be collective. For example, as intelligence is attributed to the human brain and this one is constituted by neurons, one could very well speak of the intelligence of person x as the intelligence of the collective of neurons of x. Although such an approach does not seem to contain any flaw, it is not usual, and in this article, one will follow common usage considering intelligent collectives made up of individuals as computers, animals, or humans.

The collective or non-atomic character of the entity suggests comparing the intelligence of the entity (as a whole) with the intelligence of its constituent individuals. When such comparison is made with regard to human organizations or to human groups in general, one is led to a striking observation. There are many cases where the CI of an organization is greater than that of its most intelligent individual, but many cases are also known where organizations made up of very intelligent people actually did and do behave in stupid or abstruse ways.[1] This has the following consequence. Research in CI may and should be undertaken in an all-encompassing perspective. But in a more pragmatic, human-centered, and, for the purposes of this encyclopedia, organizational point of view, one is interested in eliciting conditions for the development of the CI of human organizations.[2]

The advent of computer networks and the Internet made the notion of CI most pressing and unavoidable at present. Computers and the Internet constitute devices of a new kind for amplifying human intelligence. The speed to which information and knowledge becomes available to people and the new patterns of interaction among them that are possible, make viable a whole new panoply of collectively intelligent behaviors. Intelligent behaviors that are only possible because they are collective by means of the synergetic connections among people established through the Internet. They prompt for reassessing what intelligence is.

Meanwhile, the development of social animals' studies revealed the existence of collectively intelligent behaviors in their societies to an extent and of a sophistication level unknown until now. Rather than being, say, a property or invention of civilized human societies, CI appears to be a very general process observable even in bacteria.

How general is this process? It must be quite general. Let one consider collective entities which are subject to causes adverse to their persistence in time or to their development. Then, if they persist in time or they develop or fulfill other goals, they must be collectively intelligent in some sense, and talking about their collective intelligence[3] is meaningful.

If the processes of creating CI are general and on-going, it is of strategic importance to understand their principles and put them deliberately at work in the human realm. At the dimension of very large groups, like the species, human nations, cultures, or religions, the dissemination and use of such principles may well make the difference between sustained development or catastrophe, peace, or war.

At the dimension of organizations in the strict sense of the word, enterprises, corporations, universities, governmental agencies, international organisms of all kinds, to understand and deliberately use principles of CI may make the difference between being able to create and sustain an organization or not, between the development of the organization and the deep attainment of its goals or not.

The spread, development, and application of the concept of a networked or virtual organization (NVO) could not have occurred and cannot go on without computer networks. So, one may say that NVOs are not only supported but also ontologically intertwined with them. Because of this, one may expect that, among all organizations, NVOs are in an especially favorable situation to explore the synergy between collective intelligence ideas and the capabilities made available to them by their underlying computer networking technologies.

BACKGROUND

Collective intelligence research may be used as a tool to discover ways for making human organizations more adaptive and more efficient—among other tools. Other branches of thinking, with which one can imagine CI fruitfully cooperating to this end, are learning organizations, organizational intelligence, or chaordic systems. Here no attempt will be made to relate CI to them; rather one concentrates on important contributions to CI, reviewed below. The notion and concept of CI is evolving with two scales in mind: at the scale of the human species and at the scale of groups or systems of computers, animals, or humans—that is, at the scale of organizations, *stricto sensu*.

At the scale of human species, Teillard de Chardin (1955) is acknowledged as a seminal thinker in the field by having elaborated the concept of noosphere.[4] The noosphere or the sphere of ideas is conceived as a sphere upon the biosphere, in some way, the collective mind of Earth. Another concept which naturally leads to CI is that of the global brain (GB). According to Heylighen (2005a), "the 'global brain' is a metaphor for the intelligent network formed by the people of this planet together with the knowledge and communication technologies that connect them together." The GB idea comes naturally from the conception of society as an organism of its own: the global superorganism (Heylighen, 2005b). The very term "global brain" seems to have been coined in 1983 by Russel (1995). The connection between the Internet and Russel's concept was made in Mayer-Kress and Barczys (1995).

From 1995 to present, the GB concept and the study of its connections to CI have matured by the work of Heylighen and other researchers linked to the Principia Cybernetica Project (PCP). Seemingly unconnected with PCP, Bloom (2000) explores the idea of CI and the global brain, in an original, eventually controversial way, pushing it to very large limits.

To the best knowledge of this author, the first book fully dedicated to CI was Lévy (1997) with the English translation in Lévy (1999). Lévy analyzes CI in broad sociological and anthropological terms, as a phenomenon gaining strong momentum from the emergence of cyberspace with a span from politics to aesthetics passing by economy and with definite ethical meanings.

The potential impact of CI on political conceptions is obvious from the moment one realizes that politics is the formal machinery with which societies react to problems and drive themselves to the attainment of social goals in more or less collectively intelligent ways. Under the akin term of *co-intelligence*, Atlee (2002) examines the political praxis under the perspective of CI and the avenues it opens.

For the development of CI both as a theory and a practice, efforts as above which frame CI in wide scales and general terms are essential. But to attain practical effectiveness, to know how to develop CI inside organizations, detailed analysis of the processes and structures by which collective entities are and become intelligent must be done and logical models for them

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