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Review of "The Science and Praxis of Complexity"

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Interact with complexity

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The Science and Praxis of Complexity. Contributions to the Symposium Held at Montpellier, France, May 9-11, 1984. Tokyo: United Nations University, 1985. Distributed by Unipub, New York. viii + 384 pages. $25.00 (soft).

In May of 1984, in a symposium sponsored by the United Nations University, 37 scholars and practitioners from all over the world met in Montpellier, France, to discuss what seemed to be a common and increasingly pressing problem: complexity. The list of participants is impressive, including K. Boulding, T. Hagerstrand, H. Henderson, N. Luhmann, R. Margalef, E. Morin, K. Pribram, I. Prigogine, and H. von Foerster, to name a few. The 384 pages of this volume contain most of their contributions, organized in five sections: understanding complexity, complexity in focus, complexity in nature, complexity in society, and overviews.

An initial reading seems to suggest little commonality among these contributions. Boulding writes about knowledge and what we have not managed to understand. Le Moigne is concerned with the vicious circle in which human intelligence creates complexity and complexity requires human intelligence to be understood. Luhmann suggests that complexity is to the natural sciences as meaning is to the humanities and the social sciences, sharing some of the same difficulties of understanding. Atlan amplifies the difference between natural complexity and the self-creation of meaning, and Dupuy contrasts autonomy with complexity in society. Predictably, Prigogine and Allen link the emergence of complexity to dissipative structures, while Pribram links it to brain activity (holography in particular). Holling and Margalef consider the complexity of ecological systems, to which Aida wants to see technology added. The economist Giarini approaches the concept from the point of view of the vulnerability of economic systems leading to policy, management, and methodological considerations, which are addressed in papers by Voge, Kirby, Malaska and Klir, and many more. Zeleny gives a good account of the history of some of the pertinent concepts, and Chapman writes the overview. This multiplicity is inviting to readers but defies detailed review. Let me therefore focus on just three common threads.

The first is epistemology. Boulding's contribution starts with a revealing statement claiming that "complexity is a very complex problem"; this is echoed later by Ploman, who suggests that "the subject of complexity is ... a prime example of complexity." These make complexity a second order concept, one that can be applied onto itself like the meaning of meaning (Luhmann, after Ogden and Richards' famous book), the computation of computation (Le Moigne, quoting von Foerster), information about information, etc. It suggests that complexity is not entirely rooted in properties of the real world but is very much a creation of the human observer, who cannot but recursively operate in language; and, indeed, many contributions link the concept to difficulties of human cognition in understanding a phenomenon, solving a problem, or managing something difficult to know in detail: ultimately, to be conscious of oneself. In these contributions complexity is no longer the property of an object, independent of an observer, but arises in processes of interaction between the two. This shift from things to cognitive processes is one motivation to talk about the possibility of a new science of complexity in which epistemological

problems are integral to research.

The second thread is the abstract nature of the domain. Traditionally, academic disciplines have specialized in object areas (e.g., physics is concerned with matter, biology with living organisms, and sociology with social organization) or in approaches to problems (e.g., psychology aims at knowledge and healing). From this vantage point it sometimes reads like animism when the conference contributors claim that "complexity threatens" or write about "research into complexity," "managing complexity," etc. However, on a second reading of the book, there seems to be an emerging consensus that complexity need not be treated as a mere attribute of some object of investigation (e.g., "the complexity of an economic system" or "complex" versus "simple" explanations) but rather indicates problems that are widely shared across disciplines. This idea, while challenging the traditional academic classifications, is not without historical precedence. Syntax, systems, and (last but not least) communication have similar empirical grounds in that the phenomena cannot be experienced without a material base but can be studied without reference to it.

The third common thread is the role of information theory. In reading these papers, one is struck by the extent to which experts from so many fields use the language of Shannon's information theory. The close connection between information theory and thermodynamics, linking the social sciences, including psychology and economics, with ecology, biology, and physics, may be one reason. Another is that it can be measured in a great many processes and regardless of their particular material forms. But probably the most important reason is that information is defined in terms of decision making and is naturally tied to the management of complexity (see H. Simon's famous "The Architecture of Complexity"), thus providing at least one common approach to complexity. To be fair, not everyone uses information in Shannon's technical sense. The biophysicist Atlan also makes use of Kolmogoroff’s algorithmic approach; the sociologist Luhmann extends it to the selectivity of meaning. Others refer to different levels of description, but virtually everyone uses notions originally found in information theory.

While notions of information, communication, circular networks, and organization increasingly become the rallying concepts of scholars from a variety of backgrounds, be it under the umbrella of systems theory, cybernetics, cognitive science, or, in this case, a (not yet established) science of complexity, it is surprising that communication scholars are virtually absent in such endeavors. Could it be that communication researchers have limited themselves to a restrictive vocabulary and repertoire of models, involving people as senders and receivers, through which higher-order structures are not recognizable? Could it be that communication researchers have surrendered to technological determinism by studying attitude change, persuasion, social stratification, and media uses all in response to the unquestioned existence of communication technology? Could it be that the adoption of epistemologically inadequate paradigms prevents communication scholars from understanding information and meaning as socially constructing the complex realities we communicate with and manage?

The book is unquestionably stimulating. Readers will have to find their own answers to why and what they are doing as communication scholars and how complexity interacts with their lives.