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Sociocybernetics and adaptive systems: constructing a heuristic method to conduct interdisciplinary research using complexity theory

Socio-cibernética y sistemas adaptativos: construyendo un método heurístico para realizar investigaciones interdisciplinarias usando la teoria de la complejidad

Amozurrutia, José Antonio (2011), *Complejidad y ciencias sociales. Un modelo adaptativo de investigaciones interdisciplinarias,* Universidad Nacional Autónoma de México, México, 443 pp., isbn: 978-607-02-2708-0.

Introduction

For all those academicians and students feeling constrained by disciplinary methodologies this is a reference book that deserves examination. Amozurrutia delivers with generosity a proposal of methodology coherently based on the paradigm of complexity and two of its major epistemologies: genetic epistemologies and sociocybernetics. This is not an easy enterprise. In the last decades, we have assisted to a proliferation of literature within the paradigm of complexity, and particularly about system's theory, applied to social phenomena; and sadly too often, we return to expose, collect and analyze *data* using the tools of linear-based disciplines confounding *complex* with *complicated*.

The constructivist challenge to the modern social disciplines that depart from aspirations of objectivity is recognizing that every image of the world is a construction of our minds; hence, there is not an external reality we can just report objectively (Schrödinger, in Watslawick and Krieg, 1991; Von Foertser, 1973; Piaget and García, 1982; Von Glaserfeld, 1990; García, 2000, 2004). With this book, Amozurrutia discloses the epistemological challenge of recognizing those social phenomena cannot be observed, reflected and intervened independently from the observer. By doing this, he questions the internal coherence of investigation methods that allegedly depart from complex and constructivist approaches but also return to assume that external reality exists independently from the research and the researcher, and intend to approach objectively a social

phenomenon. On the other hand, Amozurrutia also defends the necessity to build trustworthy social research. Following Parsons (1968), Piaget (1977), Piaget and García (1982, 1997) and García (2000, 2004, 2006), Amozurrutia builds a heuristic method using informatics' strategies to develop an interdisciplinary research method coherent to that proposed by genetic epistemologies and sociocybernetics' authors.

To understand where this book comes from, it is necessary to mention that José Antonio Amozurrutia –the author– is himself a perfect example of the embodiment of interdisciplinary knowledge. He is a musician and musicologist, a chemical engineer, software programmer and designer, and a sociologist. He currently works in the Center for Interdisciplinary Research in Sciences and Humanities of the National Autonomous University of Mexico (CEIICH-UNAM) and is founder of the Doctoral Program in Sciences and Humanities for Interdisciplinary Development at the University of Coahuila (in partnership with UNAM). Besides, *Pepe* (as his close friends and collaborators call him) has a reputed generosity for teaching and his work in the Laboratory of Development and Research in Complex Communication (LabComplex) keeps him in touch with students with various degrees of studies and many social-oriented projects.

1. Structure of the book

The book is divided into three parts, three chapters each, in addition to an introduction and a chapter for conclusions, as well as a list of figures and references; moreover, the book also includes a prologue (written by a friend of the author and main proponent of cybercultural theory, Jorge González), and a preface (produced by Chaime Marcuello, a remarkable Spanish exponent of the sociocybernetics theory). It is also important to mention (and thank) that the book offers many figures that work as helping maps that aim to situate the reader and clarify the concepts developed.

The first part describes the challenge of approaching a social problem departing from multiple disciplines and observation levels (ch. 1), it explains that the strategies to deal with this challenge have been quantitative and qualitative, and briefly explains the limitations of using those strategies to approach complex phenomena (ch. 2). To overcome the limitations of quantitative and qualitative research methods, Amozurrutia explains that it is necessary to redefine the questions traditionally used in social research; accordingly with the epistemologies he defends (ch. 3).

The second part delivers an outstanding theoretical discussion that grounds the epistemology of the proposed model. To achieve his aims, Amozurrutia exhaustively revises the genetic epistemologies theory (ch.

4); and reviews in depth the systems theory (ch. 5). Then, he links both theories and proposes to use the substantial aspects of both to better comprehend complex problems (ch. 6).

The third part proposes a model for social analysis departing from the epistemological stances previously stated. To do so, the author describes how an adaptive systems' model would work (ch. 7), offers a method for building such model (ch. 8), and exemplifies it with a case study (ch. 9).

2. Understanding the track of the proposal

The paradigm of complexity works based on the notion that the world is so interconnected that linear explanations are not enough to understand any given problem without distortion, and that admitting the wrong assumptions on the base of a problem can be catastrophic when attempting to apply linear solutions instead of systemic tools. The general systems theory (Bertalanffy, 1950) allows overcoming the loops of linear thinking and helps to understand how certain properties, not observable in the elements of a given system, could emerge when the whole system is approached, and remain inconceivable if we undertake their analysis (dividing the whole into parts). Ilya Prigogine won the Nobel Prize (1977) demonstrating how systems theory could work applied to thermodynamic problems. Niklas Luhmman (1984) explained how this theory could be applied to social systems, and from the interactions of cybernetics and social theories a new research approach arose: sociocybernetics (Geyer and Van der Zouwen, 1992; Marcuello, 2006). Sociocybernetics is currently the Research Committee 51 of the International Sociological Association (ISA), in which Amozurrutia actively participates.

In parallel, Jean Piaget (1966) scientifically demonstrated how humans learn and how knowledge is constructed through developing cognitive structures, and explained with Piaget Jean, Rolando García (1982) that every information input implies a new reorganization level of the system cognitive capacities. From the results of scientific studies, Jean Piaget shaped the theory of genetic epistemologies. It is important to highlight, to avoid confusions, that the notion *genetic* is here referred to *genesis*, thus it entails the idea of birth or spring, and not to the more generalized notion of *related to the genes*. With genetic epistemologies, Piaget and García proposed that learning is propelled by two abstraction forms: the empirical and the reflexive. Rolando García (2000, 2006) connected genetic epistemologies to complex systems theory. He proposed going beyond multidisciplinary efforts to approach problems and creating authentic transdisciplinary spaces to approach complex problems in empirical and reflective ways, leaving behind the modern aspiration of unders-

tanding something by analyzing exhaustively and separately its parts. Rolando García works in the Center of Interdisciplinary Research in Science and Humanities of the National Autonomous University of Mexico (CEIICH-UNAM), the same place in which Amozurrutia works.

3. The experience and reflection of learning

The adaptive model is essentially heuristic; it is basically an action-research proposal for learning. To achieve its aims the adaptive model is based on the construction of a categorical scheme on the basis of the experience, knowledge and reflections of the researchers, and the studies, considerations and feedback the researchers can accomplish as a team about their own activities and the lessons learned during the investigation process.

Action research is usually conducted by people concerned with the context to be researched; their findings should feed directly back into practice with the intention of creating beneficial trade-offs among all practitioners. It requires collaboration and agreement with the community where it is to be conducted; it is grounded on the culture and values of practitioners; and the researcher is simply one more practitioner (Somekh, 1995). Similarly to the ways proposed by John Elliot (1990), Amozurrutia also stimulates collective reflection based on open information to become critical of social problems. The heuristics of the model can also be coincidental with Dewey (1916) and Habermas (1971), as Amozurrutia is also deeply worried about the efficiency of the reflection process and the ability to correctly operate collective reflection as a tool. In this sense, I would inscribe Amozurrutia's method in the sphere of rationalists –the thinkers who truly believe the world will become a better place by bringing reason into it–. On the other hand, Amozurrutia admits and promotes understanding emotions as a part of social dynamics and as a part of the research process itself.

Amozurrutia does not explicitly propose that skills that may be needed by the researchers who hypothetically would conduct his method. However, it is implicit that the construction of the categorical scheme he recommends would require at least one highly-qualified team member. The examples he offers in the book demonstrate a wide range of possible applications and how learning-by-doing research can achieve not only very valuable learning processes for real people, but also honest and worthy investigation products.

4. Discussing the model

The main task undertaken by Amozurrutia is departing from a constructivist approach and moving within the paradigm of complexity, using the systems theory and applying genetic epistemologies, to propose an innovative interdisciplinary model for investigative teams conducting trustworthy social analysis attempting at the same time to transform social dynamics. In my opinion, he reaches his aim.

However, I see at least three challenges: *1)* the creation of truly interdisciplinary teams; *2)* the possible oversimplification in the construction of categories and values; and *3)* the risk of reifying social dynamics.

The first challenge, creating truly interdisciplinary teams, is a practical and generalized task for academicians nowadays. How can academicians truly listen and treat with respect other epistemological traditions? It seems that many disciplines have expansionist views and it is very common that academicians from one area distrust explanations and methods from other disciplines, not to mention that measuring and quantifying almost everything has become a kind of extremely powerful fetish, which can decide endowments and provide certain investigations with *seriousness*. It deserves a lot of reflection to avoid the temptation of using mathematics to minimize other languages, and recognizing that 'narratives' can be also a trustworthy source of systematic knowledge. ceiich-unam accepts this challenge and offers a post-degree Diploma of Professional Updating on Interdisciplinary Research –in which Amozurrutia actively participates–. The Diploma has been a success; it has demonstrated however, the difficulties to create interdisciplinary teams and the importance of formal processes for the construction of these teams and how difficult it is to dismantle the expansionist impulse of disciplinary knowledge.

Secondly, the possible over-simplification in the construction of categories and values entails at least three risks: *a)* the possibility of ignoring the richness of discussions on a given phenomenon, and thus oversimplifying its representation; *b)* the possibility of structuring the phenomenon in excess, hence oversimplifying it in order to make it fit into the proposed model; and *c)* the possibility of over-describing *how* the phenomenon is, instead of recognizing *why* it works in the exact way it does. These risks are not exclusive to this model, of course, and the limitations of models to explain reality have been widely discussed in recent decades. It is necessary to highlight this precisely because one of the main tasks of authors within the complexity paradigm is to avoid oversimplification. And creating a model, even adaptive, entails the limitation of almost every model, which can be counterproductive for the aims of the complexity paradigm. The endeavor of Amozurrutia is to make the model flexible;

the structures sketched do not look very supple though. On the other hand, how can we provide trustworthy research if we cannot systematize different phenomena and re-express it in mathematic language? Maybe this is the reason why Amozurrutia prefers taking the risk and trusting in the team's capacity to reflect and decide on these issues. It is very valuable and not a minor decision to trust in people's criteria and their honest reports; yet it remains a risk.

Thirdly, the risk of reifying social dynamics seems to me a very common mistake when *natural* scientists or some economists approach social problems. Reification is "the mental process of making something fixed, or thing-like, when in reality it is the outcome of a particular kind of social relationship" (How, 2003: 63). In my doctoral thesis (Barrón, 2011) I explored the risks of reification in Amartya Sen's proposal (2006) to approach cultural identities and the symbolic and systemic violence it may involve. Most social problems are products of social dynamics and not of the presence or absence of certain characteristics in the elements of the system. Categorizing a social phenomenon might create the illusion of understanding a social problem by exhaustively numerating and analyzing its components. This would be a major problem that theories within the complexity paradigm seek to avoid. Amozurrutia recognizes this risk, and again delivers the responsibility to people conducting the investigation: the model considers second order reflections to understand how knowledge was acquired and reorganized, and ideally the reflection should avoid these risks. It is foreseeable however, that focusing on the categories of the phenomenon instead of on its interactions with other phenomena could imply full-descriptions, but maybe it will find difficulties to be very critical in terms of power relations.

Final reflection

In this book review, I attempted to share my own reading, trying to be fair with the author's work and to the potential reader too; I hope I have made it.

The book represents an extraordinary (and successful in my opinion) effort to posit different questions and alternative paths to conduct social research. The book is theoretically robust and purposively generous. It is presented as a manual for easy consultation, and it also includes the profound reflections of the author, which are worthy indeed. Even the proposal is not trivial, the structure is coherent, the argument is clear, and it allows multiple reading levels and uses.

The methodological proposal deserves to be disseminated and discussed. In our times of old problems needing new questions, this proposal

delivers a fresh alternative to build interdisciplinary teams for social research. The model proposed implies risks –I sketched three– but it might be worth for further applications to see how it works and explore its limitations in real life. Meanwhile, I welcome this model to be applied and discussed. Also, I want to express my gratitude to *Pepe* Amozurrutia because of the opportunity and the challenge of submerging myself into his thinking and allowing me to participate in the multiple processes of learning he is currently boosting.

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