Community of Inquiry as a Complex Communicative System[1]

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Complexity theory has been steadily gaining recognition over the last half a century as a new way of understanding the organization of systems on all levels—whether organisms, social systems, business organizations, or ecosystems. Contrary to a mechanistic, analytic approach to the study of phenomena, the complexity perspective takes into account all interactions between the components of a system, which it understands as in dynamic interplay. In this paper, I will attempt to re-describe community of inquiry (CI) as a complex system, and draw some implications that follow from taking into account such description.

By community of inquiry, I mean a relatively small (10-20) group of people engaged in a conversation (or, preferably, an ongoing series of conversations) about an agreed-upon concept or problem or question, which is convened and overseen by a "facilitator" who is committed to certain normative ideals, chief among which is the construction of an "ideal speech situation" (Habermas, 1990)—that is, a discursive setting in which everyone has equal right and opportunity to speak, in which intimidation of any sort is absent, and in which epistemological authority is distributed rather than centralized in one person. The group enters the dialogue with the shared intention of participating in ongoing critical deliberation together about the issues, with the expectation that new meaning will arise from their interaction and the challenging and testing of each other's assumptions in the common space of dialogue. In all forms of community of inquiry there is a set of basic discourse rules, implicit or otherwise, that participants abide by, and one or more "facilitators"--who act to clarify and to coordinate the emergent structure of ideas and arguments that the conversation generates (Kennedy& Kennedy, 2010).

I will start by spelling out a distinction made by Paul Cilliers between two types of systems: complex and complicated (1998). A modern jumbo jet is a complicated system—it has intricate sets of mechanisms and automated devices. Because all of those mechanisms have fixed relationships between their elements, the entire jet can be analyzed by "parsing" it into its different segments, and a thorough description and understanding of the jet can be produced by assembling the descriptions of the different parts that comprise it. On the other hand, an ecosystem or the brain are complex systems, in that they are characterized by non-linear relationships and feedback loops. Such systems can only yield partial analysis, which can produce partial descriptions. It is not possible to fully understand a complex system, like a cell, an ant colony, human society, or communication among a group of people by taking it apart like a mechanistic device. The traditional analytic method that works well with complicated and simple systems does not fare well with complex systems. The problem is that the traditional analytic approach of taking and studying smaller parts of a system destroys its so-called "emergent properties", which result from the interaction among its components. As we already mentioned, those properties cannot be reduced to the characteristics of the components themselves. An example of an emergent property is consciousness, something that arises from the interactions of single neurons and even mundane phenomena, such as walking, and which cannot be understood when only parts of the human body are examined.

In community of inquiry, some emergent products are collective arguments or a collectively elaborated concept, and even more ephemeral products like justice, respect, care. Emergent properties are usually the important features of the system that we want to study, and in order to do this, we have to deal with the system as a whole. As the truism associated with complex system goes, "the system is always more than the sum of its parts."

Complex systems are typically the ones associated with living organisms or groups of living things like humans, viruses, social systems, language, oceans, or the brain--systems, that shift and change, self-organize and self-produce, of which community of inquiry (CI) is one example.

CI as a Complex Communicative System

If we accept the social system theorist Niklas Luhmann's (1995) argument that social systems are communicative systems, and his useful and compelling definition of complexity, community of inquiry as a communicative system may be understood as complex, in that it contains more communicative possibilities than can be actualized. For example, on the level of group interaction there are always more themes than can be explored, more questions than can be pursued, and more concepts than the group can take up for inquiry. On the individual level, there are always more possible interventions than one can actually make. Community of inquiry shares many important characteristics that Cilliers believes are common to all complex systems : rich, interconnected and nonlinear interactions; recursion, redundancy, feedback, adaptability, and autopoiesis. (1998). I provide a brief description of those characteristics below, in the context of the dialogical format of a community of inquiry (CI hereafter).

Davis and Simmt (2003), in describing the emergence and the functioning of a learning community of pre-service teachers as a complex system, emphasized eight characteristics of such a community: internal diversity, redundancy, decentralized control, organized randomness, neighboring interactions, regulatory constraints, emergent diversity, and distributed control. I would diverge from Davis & Simmt's description of a learning community in complexity terms, in particular in the interpretation of two characteristics-- decentralized control and neighboring interactions. This is due to the difference in the forms of the communities we describe. Davis &Simmt (2003) portray the forming of a learning community of pre-service teachers who have organized themselves into study groups, thus forming a network of connected study clusters. None of the teachers were in charge of the collective, any more than one individual may be said to be in charge of an ant colony, the growth of a city, an immune system, or the functions of the brain. These are all decentralized systems, without a central authority. The behavior of any element in the system, and thus the system in general, is influenced by the interactions in the systems, and particularly by communication with the most closely located elements, or by the nearest neighbor interactions. Thus, if an ant encounters a high rate of nest-maintenance workers entering and leaving the ant colony, there is a higher probability that it will adopt a nest-maintenance job, and if it encounters ant foragers busy lugging food home, the chances are it will switch to foraging (Mitchell, 2009). Similarly, in human learning communities learners are greatly influenced by communications with other learners from the same small cluster (Davis & Simmt, 2003).

In comparison, in a community of inquiry every participant is potentially connected to every other, and since all communication has the same range, every communicative intervention is potentially equally influential. Also CI might be better understood as a complex system governed by certain communicative meta-rules from the start, where the facilitator is the central communication organizer, the one who enforces those rules. Thus the term decentralized control, often used to describe complex systems, does not do justice to the control mechanisms in CI. The facilitator in a CI exercises control *procedurally*—she may act to regulate the distribution of turns or the length of a speaker's intervention, call for paraphrasing, summarization or location of the argument, or insist on a group response to an intervention that has been over-ridden by the next speaker.

Although it may appear that it is the facilitator who is navigating the direction of the group, unilateral navigation is in fact only possible, if at all, in a closed, controlled system, in which the teacher dictates events and meanings, and inhibits any dynamic emergence. Her operative goal is in fact to enable as much as possible communicative diversity and clarity, in the interest of acquiring new meanings, and better participation. In fact, we could say that procedural control, because it holds everyone responsible for adhering to the communicative rules, enables a CI to work towards its regulative ideals—*distributed thinking*, *distributed intelligence*, and *distributed agency*. The term *ambiguous control* (Lushyn & Kennedy (2002) indicates that it is neither centralized nor decentralized control, but a more complex control mechanism that facilitates the organization of a complex system of communication.

In a collective such as CI, each intervention is understood as potentially important, and it is never exactly clear how much and to what extent an intervention might affect the course of the inquiry or its group dynamics. The facilitator may have more perceived authority to steer the group, but other members—those less constrained by the internalized hierarchy of the traditional model—may exercise their distributed authority from the start. This should be welcomed by the facilitator, whose long-term goal is the distribution of power within the system, just as she encourages the emergence of distributed thinking and distributed self-expression. In a more mature CI, the facilitator also strives to distribute procedural authority throughout the group—that is, to promote a system-condition in which *all* participants, including herself, share in such things as regulating the distribution of turns, calling for summarization or restatement, calling for definitions or examples, encouraging alternative hypotheses, identifying unstated assumptions, and similar activities. Neither *distributed control* nor *ambiguous control* imply that control is equally distributed or that relationships between the members of the group are symmetrical; nor does it mean that those relationships are of domination or exploitation, although this cannot be guaranteed. Non-linearity, asymmetry, power and competition are inevitable to the dynamical nature of complexity, and necessary for maintaining it (Cilliers, 1998). If relationships were symmetrical and power was equally distributed throughout, the system would quickly lose energy and stagnate. Asymmetry insures shifts in the "weight" of contributions, and in levels and distributions of communicative control and power.

Ideally, interactions in a community of inquiry are "rich" and interconnected in the sense that every interaction influences and is influenced by others. CI deliberations are *nonlinear*, in that some interventions are amplified, and have a greater effect than others. This is usually described in complexity theory as the "butterfly effect," in that small causes can have large effects and vise versa. Any member of the group can also intervene and change the direction of the inquiry with new substantive or procedural suggestions. The inquiry itself can shift direction through a series of individual moves within the "conversation plane," and the conversation can shift "vertically" between inquiry, reflection on the inquiry, and feedback. The interactive dynamics are constantly changing—whether in levels of participation or levels of clarity of the "argument." This presents a picture very different from the traditional monological, unidirectional model of classroom conversation, in which, when there is interaction, it is most typically between teacher and individual student.

Complexity thrives on the ambiguous, just-barely-in-control interplay between CI group members, in which the pattern of intervention is *recursive*—new interventions connect with previous ones and may even appear to repeat them, but their measure of difference opens possibilities for future interventions, thus forming patterns of argument that make of the structure of CI an emergent constellation of interactions. In fact recursion is a primary characteristic of this form of collective dialogue, demonstrated through members' repetition of utterances, or through paraphrase and summary; recursion is thus associated with redundancy, which assures through repetition that what might not have been well-articulated, or which remains ambiguous, can be communicated again.

Recursion is a sign of redundancy, which means that there are informational overlaps and alternative communicative routes that insure the system's flexibility. Because the system has a memory, and each event informs consecutive events, the system's history is not reversible. Recursion and *redundancy* are carried by the *feedback loops* that are endemic characteristics of complex systems. A *negative feedback loop* has the function of maintaining the system's stability through inhibition and stabilization. For example, a negative loop is initiated when the facilitator or another member suppresses, on the grounds that it is not relevant to the current inquiry, an intervention initiated by a group member that has the potential to open a new direction, or promises to change the current group focus. Positive feedback introduces more diversity—for example, when a member suggests a new perspective on the issue at hand, thus stimulating reconceptualization or consideration of a new perspective. As a whole, the system operates far-from-equilibrium; equilibrium is in fact "enemy" to the system in that it represents stagnation or actual system-death. As such, the system is fed by a flow of new perspectives, new information, and new meanings. Any stability that is achieved is of a dynamic nature, in a communicative zone that is between chaos (too many disconnected interventions, to the point that meaning-making is impossible) and stagnation (no new information at all) (Kennedy & Kennedy, 2010). It is said that complex systems involve an interplay between chaos and non-chaos, and that they operate at "the edge" of chaos (Kauffman, 1995; Baranger, 2000).

All biological and social systems exhibit the two basic characteristics of cooperation and competition. An important insight that comes from a new understanding of living systems is the recognition that networks are basic patterns of their organization, and that a network's complexity involves an interplay between cooperation and competition (Capra 1997; Kauffman, 1995). Social systems are networks of organisms; organisms are networks of cells, organs and cells are networks of molecules, and they survive because of the intricate coupling between cooperation and competition, where often cooperation on one level underlies competition on another, or the other way around. For example, members of a CI are typically competing for the opportunity to shape the character of the discussion with their own ideas, but do so in the interest of collaborative reconstruction of the concepts in play.

CI as a communicative system is always reproducing itself, in a process that has been termed "autopoiesis" (from "auto" self and "poiesis" production) by the biologist and philosopher Humberto Maturana (Varela, Maturana & Uribe, 1974). Along with the production of utterances that constitute judgments, arguments, and sequences of argumentation, there is the autopoiesis of ideas—new meanings that co-evolve with each individual's thoughts, feelings and expectations. However, all events in the communicative process are discrete and temporal. Thus the autopiesis of the communicative system as a whole depends on the ongoing disintegration and reproduction of the materials and the catalysts necessary for the continuation of the process. The autopoietic process constantly increases the complexity in the system, which in order to survive struggles to reduce complexity. Out of the necessity for the system to maintain an autopoietic balance in CI, just as among any interconnected elements in any living system, there emerges the necessity for *regulatory constraints*. Constraints are limiting, but are also enabling.

For example, selection is a constraint born from the impossibility of connecting every intervention or communicative event to every other one in the course of the communicative process. If there is no selection, then the proliferation of communicative moves and events will amount to chaos in the system. Selection is both *enabling and constraining* for the production of new ideas and meanings, and therefore must steer its way through the complexity of communication. Any order in a communicative event emerges through a reduction of complexity and through the selective conditioning of this reduction. Without such selections in the communicative process, the CI system would quickly reach incomprehensible complexity.

The emerging communicative structure's self-organizing process is not controlled or predetermined in any way, and is a response to the system's environment, or context. Ashley (1962) points out that each dynamic system generates its own form of self-organization in response to its need for survival and for the management of complexity. Only by structuring complexity and imposing constraints can a communication system acquire "internal guidance," and make self-reproduction possible. This is what ensures the quality and connectivity of the communicative events. In that sense, CI develops an organization (structure) of communication that is in unison with the general CI meta-rules that ensure balancing of weight, distribution and good communication "traffic" of all communication moves, but yet is always unique to the particular system.

Complexity is fed by the diversity in the system, but as Page (2011) notes, it's not so much the *fundamental diversity* or the diversity of the members of the group that is important for complexity. Rather, what is essential is the *emergent diversity* in the system, which in CI is manifested at higher levels—that is, in the communicative products of ideas, linguistic expressions, restatements, and summarizations, the recombination of which produces complexity.

Because the elements of the system are interconnected and adaptable, the system as a whole is self-balancing, and although there may be crises and breakdowns, the latter represent—potentially anyway—transitions to a new state of dynamic balance. The autopoietic function finds expression in the idiosyncrasies of the group-as-a-whole and the interactions among its members. Notwithstanding its systemic contingency, for any outcome could always be otherwise, CI as a communicative system is quite robust, and its emergent structure relatively stable in time and across contexts.

Acknowledgment and respect for complexity

The modern (traditional) way of encountering complexity has resulted, we have discovered, in reductionism and determinism, and in the attempt for a totality of descriptions, truths, and understandings in an attempt to separate, isolate, analyze, predict, and master. Such an approach is equivalent to occupying an epistemological position from which the continuous shifting of relationships in a system are ignored and, in fact, complexity is avoided. An acknowledgement of complexity requires that we take into account our new understanding of complex systems and their main characteristics and behaviors. But "taking into account" such knowledge will require more than just "knowing about it." Dealing with complex systems requires, I suggest "respecting the complexity" of CI , not only in the dictionary sense of "regard" and "admiration" for the wondrous properties and behaviors of complex systems, but also in the etymological sense of constantly "turning round" and "looking at" (from the Latin ("*raspicere*") the system if we want to understand it better (Partridge, 1966).

What I have tried to provide here is a very general description, which does not pertain to the CI model in a scientific sense. Any models or descriptions that we create will be flawed, and in ways that we cannot completely determine in order to correct them. On the one hand, each member of the system is ignorant of the behavior of the whole system—she cannot "contain" or comprehend the complexity of the entire system (Cilliers, 1998). Nor can any model or description predict or control the behavior of a complex system. This is not to say that we don't need theory or description; in fact, complexity theory helps us to better understand the dynamics of CI. It also highlights the importance of uncertainty, contingency, local factors, specific context and timing of events. Rather than formulating fixed descriptions or models that portray CI as a fixed and rigid system, we might do better to devote ourselves to a process of describing, in the interest of understanding it, a system that is constantly unfolding and becoming. We can identify no predetermined outcome states, but some states are more possible than others. Such states occupy a space that Stuart Kauffman calls the "adjacent possible"—a space of possible other states that are close to the current state of the system. Kauffman describes it this way: "The Adjacent Possible is like a forever expanding house, where passing via a particular door from a room to another room, opens new doors in the Adjacent Possible which we explore" (Kauffman, 2010, para. 14).

We cannot grasp the essence of the system in some determinate way, since each description provides a limited view, and portrays some aspect of the system from a specific position inside or outside it, and at a specific point in time. In this sense, the description of the system is also distributed. However, we are bound to "look back or again at," "regard," "consider" (*respicere*, respect) the system constantly, appreciating its complexity; to take different "snapshots" of the system and attempt to make sense of them, acknowledging the fact that they are temporal, local, limited, and unfinished representations, but confident that they can help us to develop an ever-fuller understanding of the phenomenon called community of inquiry.

Notes

1. The paper was presented at the 2012 conference of the North American Association for Community of Inquiry in Vancouver, Canada.

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