

## **CHAOS AND COMPLEXITY THEORY: SPECIAL INTEREST NEWSLETTER FALL 2000**

The following essay represents the first part of a proposed conversation among several members of the SIG. Responses will appear in the next issue.

### ***About the Unexpected Complexity of Learning Based on Reciprocity and Human Agency* By Ton Jorg**

In one of our SIG sessions at New Orleans, an interesting discussion took place about the notion of learning as something taking place between participants in interaction within the constraints present. To me, those constraints, when taken as constraints through other people we connect with, suggested a rather limiting view on learning and development. In my view, constraints imply something static (cf. Valsiner, 1998). Such a description, without involving persons as active, engaged participants, embodies in my opinion a Spectator theory, (Dewey, 1960, see Doll, 1993; Phillips, 1995). Wanting a different description of social learning, as an active constructive process of dynamic complexity, one had better describe it in terms of reciprocal influences by reciprocal adjustments between interacting actors (Kinderman & Skinner, 1992; Rommetveit, 1992). Interaction described as a jointly organized activity. I call this kind of learning in interaction reciprocal learning (cf. Salomon & Perkins, 1998).

To show the complexity of that kind of learning and of the effects, which may potentially be non-linear, one needs a generative theory of learning. With this generative theory, one may focus on interaction as a process of producing knowledge, with the participants as active agents, co-creating and co-constructing the knowledge, exerting an influence on each of the participants by their agency, both individually and by shared agency (Taylor, 1995). This perspective is similar to the co-constructionist approach of Valsiner (1998) and Fogel (1993) and the social constructionist approach of Gergen (1994).

The corresponding model of interaction shows the connection between the intrapersonal and the interpersonal process in interaction. One of the interesting features of these processes as described from this perspective is, that the effects are not only emergent, but should be described as inherently unpredictable and indeterminate (Valsiner, 1998; Fogel et al., 1997). I have shown (Jörg, 2000) that the behavior of such reciprocal dynamic systems may be regarded as belonging to systems showing unexpected complexity (van Geert, 1994). They simultaneously show short-term unpredictability and long-term stability, which according to Edelman & Tononi (1996) is a typical hallmark of complex systems.

My purpose is modelling learning as learning to become, as development through

relationships (Fogel, 1993), also to be regarded as „a constant process of becoming‰ (Valsiner, 1998, p. 29). In time, it may lead to the possibilities of reciprocal transformation as described by Nakkula & Ravitch (1998). But in my opinion, this is only possible by the active roles played by participating agents co-constructing knowledge in interaction over time, giving time its role of enabling strengthening the relationships and thereby the process of reciprocal influencing, thus promoting the potential non-linear effects of that process. To model that process adequately, I needed a generative causal theory, based on a process of reciprocal causation, within a causal framework. The effects of such a process may be non-linear, although the  $\beta$ s as parameters are linear themselves, as known from literature (Namboodiri et al., 1975).

The notion of a process of reciprocal causation ^ taken up by me in 1996 - very easily leads to a reduced version of that learning, as a phenomenon to be described in terms of action and reaction. It was the notion of reciprocity and the importance of reciprocal relationships as dynamic constraints with a potentially facilitating role, which led to/produced the dynamic complexity of interaction and the role of agency as essential to my theorizing.

This complexity is constituted by the interdependence of interaction and the reciprocal relationships and their dynamics over time. In defining the concept of reciprocal relationships for my model, I realized that each of the partners in interactive learning has his/her own notion of that relationship. They are not only aware of it, and of its potentially dynamic character (Hinde, 1997), but they also have the possibility of building that relationship by their own agency. Through my causal generative theory, it may be easily shown that one may co-construct not only the development of the other, but of the self also, simultaneously, in the iterative process over time. By making the development of the other an agenda item (Kinderman & Skinner, 1992), the unexpected non-linear effects may show up (van Geert, 1997). That makes reciprocal learning through interaction within a reciprocal relationship a genuinely human affair.

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## **NEWS ABOUT AERA CONFERENCE 2001 ^ SEATTLE, WASHINGTON, APRIL 10-14**

Two Symposia are planned for the SIG in addition to Seven Roundtables.

Symposium One-- TRANSFORMATIVE LEARNING: A VISION FOR THE 21ST CENTURY, with Edmund O,Sullivan, (OISE) Bill Doll, (LSU) and Yang Zheng (Harvard). Cross-listed with the Critical Issues in Curriculum SIG.

Symposium Two: DEFINING (?) CHAOS, COMPLEXITY, CULTURE, AND CURRICULUM. Jayne Fleener, Oklahoma University, Presenter, leading discussion of issues proposed by Edmund O,Sullivan and related to a reading of his book,

Roundtables, organized by the following pairs: Sherrie Reynolds and Barbara Bichelmeyer  
Ton Jorg and Kathleen Martin

Brock Dubbels and Jeffrey Bloom

Dan Rea and Delores Liston

Hongyu Wang and Donna Trueit

Warren Linds et al

Forrest Parkay

The SIG Business Meeting will be held also. More to come about that.

If you have any difficulty receiving this newsletter, please notify Mary Ann Doyle at [madoyle@loyno.edu](mailto:madoyle@loyno.edu).