

(Apologetic note: this is an unformatted version of the original, formatted newsletter.)

Spring, 2000 Newsletter

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Musings on Constructivism and Complexity Theories: Interview with Dr. Jayne Fleener and Dr. William Doll By Leslie Henrickson

(This is the first of, what I hope to be, several interviews on topics, which interest members of Chaos and Complexity Theories SIG.)

This topic for today is the relationship between constructivism and complexity theories as related to education. The panelists are: Dr. Jayne Fleener, Associate Dean of the College of Education at University of Oklahoma; and, Dr. William Doll, Professor of Curriculum and Instruction at Louisiana State University.

LESLIE: Thank you both for participating in the newsletters first e-mail interview. I would like to start off the interview by posing the following question. What is constructivism?

JAYNE: At a very basic level, constructivism states that humans construct all knowledge. The constructivist tradition can be traced back to Kant who attempted to resolve the empiricist-rationalist debates of modern philosophy by recognizing that the world and mind both are limited as well as shaped by our human physiology and experiences. He rejected the notion of innate ideas from rationalism while also rejecting the passivity of perception implied by empiricism. Constructivism, even at its most basic statement of „active construction of meaning and knowledge,, implies the historically Kantian dialectical relationships among knowing and the known, cognition

and cognitive structures and the individual and society

WILLIAM: Let me add-on to Jayne,s insight. Interaction between person and environment is the important thesis to constructivism. Kant is a good place to situate the constructivist tradition, and that the intent here is to move beyond the either/or to the interactive, dialogical. Piaget picks up this theme in his magnum opus, *Biology and Knowledge*. An interactive relationship as we all know not unique to Piaget ^ Bateson, Dewey, Marturana and Varela, Whitehead and Wittgenstein all see interaction as key to their various views on teaching and learning. As such, they could be aligned against the „methodists% from Ramus to Tyler. In my own work in moving beyond methodology I address this tension. "Isms" I do not see as having an interactive base -- to me the very heart of what I see Piaget, Dewey, Whitehead, others I read talking about. When we "ist" their thoughts then we loose the very dialogue they see foundational to their views. This is why I stress so much that Piaget was not a constructivist nor a structuralist (both terms he used) but a constructivist-structuralist or structuralist-constuctivist.

LESLIE: How has the constructivist thesis been conceived by teachers and theorists in education?

JAYNE: Constructivism has been conceived of and discussed indifferent ways. For example, constructivism can be conceived as a theory of knowledge, a theory of cognition and a theory of learning. There are also debates about Piagetian (epistemological) constructivism versus Vygotskian social constructivism. Some conceive of constructivism as an instructional methodology. This last perspective seems problematic to me. To identify certain teaching practices as „constructivist% equivocates among individuals, active construction of (Continued on page 2) meaning and knowledge and classroom activities qua methods. One does not „teach constructively% nor are there „constructivist materials% that are magical tools of instruction.

WILLIAM: Like Jayne, I feel uneasy focusing on an "instructional approach." It seems "natural" and many teachers adopt this method, but in so doing we lose an appreciation for the complexity inherent in a situation, particularly in a teaching-learning situation. Therefore, to look at constructivism as singular, unique, unilateral (i.e. a method or set of materials,) is to miss the whole interactive thrust. It is the interaction between person and environment? how nature is nurtured, not nature vs. nurture that is important -- how "mind" and matter interact, how teachers and learners and text interact.

LESLIE: You both mention that the reduction of constructivism to an instructional methodology that either equivocates on or misses the interactive thrust of constructivism. Do you see other difficulties arising in the discussions of constructivism?

JAYNE: Yes, a confusion of the three approaches to constructivism comes from a focus on trying to settle debates about whether constructivism is an epistemology, a social theory, or a cognitive theory, for these debates themselves are confused. To dichotomize constructivism along different theoretical boundaries fails to acknowledge the dialectical origins of constructivism. Similarly, it is not as important whether we choose to focus on (a) Piagetian constructivism and developmental cognitive structures, (b) behaviors and habits, as did Dewey, or (c) social meanings and social learning, as did Vygotsky, but to recognize the complexity and variety of perspectives from which we can consider learning, schooling, and knowing.

WILLIAM: Jayne is kinder than I. I see the constructivist debates in us/them terms and its hard to avoid this. In order to understand the issues associated with constructivism you have to understand the tensions between empiricism, rationalism, and idealism. What I believe is important for this discussion is that Piaget sees both biological evolution and human development as being interactive. This is his "tertium quid," third way, biologically different from both Darwin and Lamarck, epistemologically different from both rationalism and empiricism, educationally different from both innateism and behaviorism.

LESLIE: What relationships between constructivism and complexity theories do you see?

WILLIAM: Any meaningful answer for me will need to deal with Prigogine's concepts of open systems and dissipative structures, and Kauffman's use of Boolean networks. Self-organization is obviously the key here, but just what is self-organization? It is not the self-organizing. It can be framed only within an open systems approach. Closed systems regulate, indeed close in, around a point; open systems by their very nature spawn creativity ? if they are to exist. Their being is a continual becoming. Open systems that do exist have self-organization as their modus operandi.

LESLIE: You both imply there are multiple conceptions of constructivism, i.e. different levels of interactions and, therefore, complexity. What can these various "constructivisms" offer the classroom teachers?

WILLIAM: At the pedagogical level I believe we all need to recognize the complex interactiveness of the teaching-learning situation. Piaget's last work with Garcia seems to move in the direction of complex systems theory. In the end, I do not see any formulaic way to teach. May I plead with us to explore the complexities inherent in a situation, particularly as teaching-learning situation, and develop whatever actions and practices we deem appropriate, not by applying definitional or logical categories but by personally reflecting on the situation in which we are immersed. And let us be immersed. I can offer one aphorism I use to guide me: "Teach few main ideas well and let them be thrown into every combination possible."

JAYNE: I like to visualize a constructivist space, namely, the space along three dimensions: social, cognitive and action. (See Figure 1, below.) The various ways of looking at constructivism can be mapped onto this space in a dynamic way. Different thinkers may predominate in particular planes. Teachers similarly could analyze where they fall within this space, not as a fixed point but as a dynamic continuum. The (Continued on page 3) complexity of our thinking about the social, cognitive and action domains of learning and the kind of dynamics that occur among these domains may define our ideas about learning and knowing.

The Social Dimension is the continuum on which many of the Piagetian psychology and Vygotskian social constructivist debates occur. Close to the origin on the social dimension scale would be ideas about individuals constructing through experience with little regard for social or societal influences. The extreme would emphasize the social over the individual.

The Cognitive Dimension is the continuum on which debates about the relationship between the knower and the known occur. At the origin of this continuum would be beliefs that there are external facts to be known. The role of humans as creators of knowledge and truths is expressed along this continuum. At the extreme would be the belief that all knowledge and truths are created by humans.

The third dimension, is the Action Dimension. Dewey described the problems of spectator learning or passive acquisition of knowledge through observation in favor of active learning and developing habits of inquiry. Constructivism along this dimension considers the active engagement of the learner.

Notes:

1. Professor Doll's forthcoming article is "Beyond Method: Teaching as an Aesthetic and Spirit-ful Quest," in *Passion and Pedagogy*, Elijah Mirochnik, editor, to be published by Peter Lang in 2001.

Is there a topic you would like to see discussed? Send me a topic and/or a potential interviewee. I will try to arrange an Email interview for a future column. The format of this column is an Email interview. For example, three questions were e-mailed to the panelists. Each had the opportunity to respond to the questions as mailed or to reframe the questions toward their thoughts. Their responses were edited and the edited interview was reviewed by the panelists prior to submission to the newsletter. Don't be shy, give it a try!! Please send comments to madoyle@loyno.edu

Some interesting web sites:

<<http://www.udel.edu/aeracc>><http://www.udel.edu/aeracc>

Contains an annotated list of useful C&C links. John St. Julien, Webmaster:

stjulien@UDel.Edu

<[Http://www.hehd.clemson.edu/complex/cmplxdex.htm](http://www.hehd.clemson.edu/complex/cmplxdex.htm)>[Http://www.hehd.clemson.edu/complex/cmplxdex.htm](http://www.hehd.clemson.edu/complex/cmplxdex.htm)

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The banner graphic is a magnified segment of the Mandelbrot set. It is a good example of self-similarity. Notice the iteration of „elephants on parade.‰ How many elephants does it take to make the big elephant?

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