
BOOK REVIEW

A review of *Complexity and Education: Inquiries into Learning, Teaching, and Research* by Brent Davis and Dennis Sumara, 2006. New York and London: Lawrence Erlbaum Associates, 192 pp. ISBN 0805859357. \$22.95 USD.

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Brent Davis and Dennis Sumara's *Complexity and Education: Inquiries into Learning, Teaching, and Research* is an insightful, clearly-written, and provocative contribution to the body of educational complexivist literature—an account we think particularly relevant for researchers and practitioners engaged in a transformative educational ethic. Evoking the phrase “more than human” (Abrams, 1996) as a sensibility where human concerns and action are nested within broader worlds of meaning, and the notion of knowing as adhering to a logic of adequacy, not optimality (a position Maturana and Varela (1998) also hold), Davis and Sumara present complexity thinking as a “pragmatics of transformation” (p. 74) offering “explicit advice on how to work with, occasion, and affect complexity unities” (p. 130). Davis and Sumara take care not to position complexity thinking as a “hybrid” seeking “common ground” (p. 4) or a “metadiscourse” (p. 7), but as a deeply complicit and participatory way of acting which might offer education itself as an “interdiscourse” (p. 159), and simultaneously as a pragmatics with which to engage in the practical educational project.

Davis and Sumara see complexity thinking as irreducible participation across multiple, interrelated systems of organization. They introduce the term *level-jumping* to describe knowing or learning as the capacity to participate in such a multiplicity of separate, yet inseparable, systems (e.g., biological, individual, social, evolutionary). We could quibble with the authors' use of the term *level*, one of those linear terms so embedded in everyday language, and which may easily suggest “higher” and “lower”, or leaving one level behind while moving to another. Yet the authors' point is precisely that these levels or organizational systems are embedded in the action of learning—simultaneously interconnected and inseparable. What such terms render visible is the

inadequacy of our current language to enfold the conceptual meanings intended, a point Davis and Sumara make strongly in arguing about how linear terms permeate our language, shaping thinking and culture. We see that terms such as “networks” or “domains” might be less hierarchical and more relational. Part of the effort of complexity thinking is to develop language adequate to the task of carrying its meanings.

The book’s content is divided into two main sections: the first sets complexity thinking within a broader history of the philosophy of science; the second takes up concerns and implications of complexity thinking for education and possibilities for thinking differently about classrooms, teaching, and learning.

Two areas of thinking in part two offer particularly helpful frameworks of thought for teachers and schooling. One is the notion that learning occurs across multiple levels of organizational systems—such as individual learners, classrooms, collectivities, curriculum structures, schools, knowledge disciplines, and pedagogical and cultural communities. To see the learning organism as not merely individual, but as within interdependent organizational systems of collectives (and not simply collections) offers a richer, more expansive notion of locations of learning. We open to possibilities both wider and deeper. We can view any occasion of learning as nested in multiple domains, to be examined at the level(s) of their emergence. Initially, teachers might find this notion overwhelming, due to the pressures they currently absorb. We can hear some arguing they have no mental space to think of one thing more. The theory that human consciousness is capable of thinking of one thing at a time (Norretranders, 1999) would appear to support their commonplace reaction. But we see the practice of participating in multiple levels of organization is already well illustrated in many education settings. Complexity thinking is not thinking about one more thing, but thinking *and* acting in a qualitatively different, relational and mutually responsive way. Davis and Sumara draw illustrative examples from their own work with schools, which ground their conceptual information in the actions and reflections of local educators.

If teachers, administrators, and policy makers could willingly look beyond individual learning and its measurement to encompass the collective learning of classrooms or of the disciplinary domain, and if they could see the context of the community as centrally involved in the knowledge generation of classroom and school, it might contribute to breaking down the isolation, fragmentation, and sense of individual burden that teachers and children suffer, as they attempt to meet all the demands that school systems place on them (see for e.g., Wien, 2004 for an exposition of such demands).

The second area of thinking particularly helpful to teachers is the notion of three pairs of mutually reciprocal conditions of emergence. These are diversity and redundancy, neighbour interactions and decentralized control, and coherence and randomness. *Diversity* refers to difference as interrelated multiple points of view or roles or ideas or visions (rather than singular answers or solutions to prescribed questions). *Redundancy* refers to richness or thickness (of ideas, points of view, materials). If Geertz spoke of “thick description” (1973) as necessary for quality ethnography, Davis and

Sumara convey the notion that thick content and interaction is necessary for quality education. By *neighbour interactions* Davis and Sumara do not mean physical neighbours, but proximity of ideas, questions, and multiple forms of representing these. If this notion is contrasted with the singular focus—expectation by expectation—that characterizes most traditional teaching, we can easily see why little new can emerge in such restricted contexts. Paired with the fact that ideas must be able to interact is the notion that unilateral teacher control of structure and collective results must be relinquished. “One must give up control if complexity is going to happen” (p. 144). *Decentralized control* is a necessary condition of emergence. We recognize that giving up control is about the most difficult thing a teacher can be asked to do. *Coherence* refers to the shared intention of a collective around a project or problem. *Randomness* refers to unexpected possibilities. A balance of coherence and randomness offers “enabling constraints” (p. 147). We think that for teachers undertaking an inquiry, arts-based, or emergent curriculum, an understanding of these six conditions would be very helpful and serve as a useful structure for guiding their thinking and practice, and interpreting their efforts. If classrooms can become richer and thicker in terms of participation possibilities, so also might classrooms and schools more readily grasp—and in turn embody—the notion of learning occurring simultaneously in multiple nested or embedded layers of organization.

It is to the final chapter, *Vital Simultaneities* that we found ourselves responding most divergently. Here Davis and Sumara offer us eight co-implicated simultaneities—phenomena or events that function all-at-once—with which to think and act. Khattar found Davis and Sumara’s notion of co-implicated simultaneities a compelling research pragmatic, offering researchers and academic writers an ethically transformative way to conduct research, given complexity thinking’s capacity to nest relations of learning into irreducible enfolded and unfolding organizational possibilities and to render the act of research complicit in the generation of knowing. Participating in and pulling together these multiply nested, mutually-responsive simultaneities might contribute to research enacted as a “profoundly ethical undertaking” (p. 16). What Khattar would have liked to see more of, and which she hopes Davis and Sumara will consider in the future, is a consideration of how these simultaneities can be translated so educational practitioners might find them directly relevant to their day to day classroom practice. Wien was also looking, in addition to explication, for heuristic possibilities that might be relevant for teachers and administrators in schools, possibilities that could support and elaborate their sensibilities of teaching and learning beyond the press of standardized curriculum and reporting. She found that the Latinate language particularly of the second, third, and fourth simultaneities—transphenomenality, transdisciplinarity, and interdiscursivity—with its attempt to cross multiple domains in several directions, resulted in a conceptual morass excessively difficult to make pragmatically clear to those directly involved in education. In addition, Wien believes that the final three simultaneities refer to qualities long recognized in qualitative research: the presence of the researcher as an agent of change that effects the research; the obligation “to reply” to

the domains to which education “listens” (p. 165); and, openness to new possibilities. (A clerical error omits simultaneity 6 as the text moves from 5 to 7.)

Yet the final chapter does not detract from the overall thrust of the book, its accomplished and clear layout of difficult scientific material, and the powerful possibilities that might arise for educators in understanding this material. As we close, we wish to offer some questions, for both Davis and Sumara and other readers, to extend the dialogue. How might complexity thinking be combined with attentive awareness, that is, awareness of/in the moment of actual experiencing, and to what extent might such attentiveness not be a condition for the capacity for complexity thinking? Secondly, how do we imagine teachers, administrators, and schools might function with conscious awareness across multiple nested domains of organization? We see the Reggio Emilia approach for Early Childhood Education, for example, as a well-developed city-wide practice of interconnectiveness of learning across multiple levels of organization that offers important contributions to this conversation, in particular, its pedagogy of listening and its research practice of pedagogical documentation to make learning visible, traceable, open to study and interpretation (Edwards, Gandini, and Forman, 1998).

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