Expanding Complexity: A Meditation

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This response offers a meditation on education's understanding of complexity theories. It explores a way of relating education and complexity theories that is occasioned by a reading of Darren Stanley's "Complex Responsive Processes: An Alternative Interpretation of Knowledge, Knowing, and Understanding." In that article Stanley lays out the characteristics of "Complex Responsive Processes" (CRP) as a framework for understanding identity formation and, as such, as a useful analogy for educators interested in "human knowledge and knowing." This response will suggest that what Dr. Stanley has begun to uncover is more powerful than analogy; it is, in fact, a back door to reconsidering a powerful and still living strand of thought on education in light of the burgeoning power of complex explanations of our shared world.

The core of Darren Stanley's proposal is that CRP—a framework found in organizational theory—has developed a way to integrate the implications of complexity theory for human knowledge and knowing in ways that, by analogy, would be useful to educators. Stanley, drawing centrally on the work of Ralph Stacey, lays out a scaffold that links the CRP approach to ideas that "resonate" with complexity theorists familiar to education. (Stanley 2009) While drawing these connections Stanley notes in several places that Stacey himself would qualify the relationships with cautions against simple, direct adoptions, most often objecting to the deterministic aspect of much complexity science. The analogizing that Stanley suggests for the educational community is a parallel alternative for our field.

Given the analogy to complexity and the often counter-intuitive implications that have been emphasized in accounts of the complex sciences—the butterfly effect being probably the most repeated (Hilborn 2004)—the expectation of the reader is that CRP's

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approaches would be similarly surprising. Yet most educators will not find the ideas put forth unfamiliar—indeed, they may find them surprisingly old-fashioned. The ideas promoted sound very much like what many educators used to believe before behaviorist perspectives came into dominance several cycles back of the turning wheel of educational frameworks; that is, it sounds suggestively reminiscent of the educational pragmatism promoted by John Dewey and George Mead. On reflection, as we shall see, it appears that the similarity is not coincidental but is reflected in Stacey's citations; this connection appears particularly strong in regard to the ideas Stanley finds most generative for education.

Stanley ably documents the resonance between many core concepts drawn from complex research and theorizing (e.g.: nonlinearity, self-organization, and emergence), but these concepts do not prove to be the ones that Stanley finds most valuable for education. It is in ideas drawn directly from CRP that he finds the most educationally intriguing ideas. In the final two sections Stanley sketches out the potential of the CRP framework for "knowledge, knowing, and understanding within a pedagogical context."

Drawing on Stacey, Stanley opens with a thorough investigation into the implications of an interlocking set of concepts regarding time, gesture and response, and significant symbols. The approach is said to eliminate invidious divisions between outside and inside, and between social and individual. These formulations strongly recall the work of G. H. Mead and Stanley directly acknowledges Stacey's indebtedness to Mead for the concept of a "conversation of gestures." Stacey himself goes considerably further, saying:

> Concepts of self-organization and emergence had already been explored much earlier in the work of George Herbert Mead (1934), John Dewey, (1934) and Norbert Elias (1939). The approach we have taken, therefore, is to turn to the natural complexity sciences as a source domain for analogies, to be understood when it comes to human action, in terms of Mead's theory of mind, self, and society, Dewey's theory of value, and Elias' theory of power figurations, ideology, and identity formation. (Stacey and Griffin 2005, 13)

Stacey places Elias in the same post-Hegelian tradition as Mead (Stacey and Griffin 2005, 217) and also refers to the pragmatists when discussing the concept of significant symbols (Stacey and Griffin 2005, 15). Indeed, the entire apparatus that ties together the rejection of dualism, the conversation of gestures, significant symbols, habit and the emergence of social organizations follows a path laid down by the early pragmatists. Mead's late focus on time in *The Philosophy of the Present* (Mead 1932) also reveals itself in Stacey's work. (Stacey and Griffin 2005, 30)

Much, then, of what Stanley finds intriguing about Stacey's work for educational purposes is, on Stacey's account, derivative of his reading of the pragmatists Dewey and Mead.

An outsider might be forgiven for drawing the conclusion that the project of CRP is to update and restate the insights of the founding pragmatists in terms of analogies suggested by the complex sciences. Indeed, it is striking how the more radical aspects of pragmatic thought that were difficult for many to accept in that day (and remain

difficult in our own) are strikingly repeated in the new sciences of complexity. Among these common, radical and disturbing strands are: utter rejection of dualism in favor of a strong version of interconnection that abolished the independent self; the associated and unabashed endorsement of materiality; an historically conditioned "pathway" view of knowledge; and the insistence that outcomes cannot be simply extrapolated from their antecedent causes, which brings to mind the pragmatic insistence that truth is found by examining consequences rather than causes.

A Common History

CRP's success in integrating pragmatic insight and ideas derived from complexity suggests a similar project of recovery for education. The field of education has an advantage over organizational theory in that the pragmatic tradition, while truncated, remains a living force in the discipline. Interestingly, focusing on the intersections of complexity theory and pragmatism would help recover some of the elements of a pragmatic viewpoint that have been attenuated over time. While the rejection of dualism and the view of truth that finds it in value in the consequences of adopting a position have remained vital parts of educational pragmatism, the tightly tied assertions that linked material causation and a historically contingent view of development in both the individual and social realms have sometimes been dismissed as "scientism" (cf. Egan 2002) or "relativism." (Fenstermacher 2006) Recovering that more rounded view of pragmatic thought offers a path toward re-forging the links to nearby scientific disciplines.

The emergence of the complex sciences also demonstrates that the pragmatic position that asserted the primacy of scientific method and material cause, while maintaining allegiances to unpredictability and historical pathways, is not internally contradictory and is consistent with working scientific approaches.

CRP, in Stanley's hands, charts out useful points for a recovery project. Already noted are dualism, the conversation of gestures, significant symbols, habit, the emergence of social organizations and a view of time bound to the present. To those could be added the role of activity in learning, and *habits* of doing, thinking, and feeling. (Dewey 1929, 3)

A recovery project seems quite possible and is arguably preferable to leaving the analytical strands of pragmatism and complexity separate, or joined only by analogical references.

A Common Topic

What is perhaps damaging about leaving the two unconnected is that such a path tends to deprive the early thinkers of their founding place in telling a unified, interconnected story about our lived world that starts from an educational locus. As Stanley's text helps uncover, these early thinkers did formulate many of the crucial insights we today tend to ascribe to recent work in physics, chemistry, and mathematical modeling. The move

to re-inscribe pragmatic ideas in terms of complexity theories unintentionally diminishes and divides the arc of history and the range of ideas that could be useful to educators.

It might, in the end, prove more useful to stand back and shift the focus to the commonalities in the subject matter of all the complex fields of study. The subject matter is what is complex, or more precisely, our purposes in engaging in these fields cannot be usefully pursued without taking into account those characteristics that complexity has highlighted.

Somewhat paradoxically, the new sciences of complexity may prove broadly valuable in generating useful analogies precisely because they draw their inspiration from fields of study that have had tremendous success in pursuing the sort of linear, causal, segmented explanations that Newton's laws and the calculus made powerful. (Toulmin 1990; Doll 1986) Physics, chemistry, and mathematical analyses have generated very powerful ways of knowing and acting based on that analytic and in consequence, the occasional places within those fields where the very well-defined and rightly-respected analytic does not suffice stand out in bright relief. As "complex" analyses arise that do demonstrate the power to make useful predictions and successfully guide human action in relation to those areas, it is incumbent on those practitioners, in a way that is not as pressing for those whose subject has never so well aligned with the dominant analytic, to assert a clear case for the use of their tools in well-specified domains.

The result, happily for those of us with purposes outside those disciplines, is a bright highlighting of some of the more generally indicative characteristics of those areas. High on that list, as Stanley following Stacey would suggest, would be non-linearity, self-organization, and emergence. It would surely be possible to extend the list and one tactic would be to focus on the qualities that seem to consistently call forth a recognizably complex analysis—regardless of the academic discipline that has historically made those areas the focus of their interest.

Such a move would result in a suggestive regrouping. Education, ecology, biology, physiology, parts of chemistry, parts of physics—all these (and surely more) have, over their history, called forth what we would now call complex analyses. They do, indeed, exhibit nonlinearity, self-organization, and unexpected emergence. Regrettably, while it is tempting to try to draw forth the underlying similarities in the subject matter, our intentions in engaging in those areas, and the changing tools that emerge as one walks down the scales of complexity, such is, sadly, not the purpose of this small meditation.

Instead, mulling over the text leads this reader to suggest that we rejigger our point of view in an attempt to yield a more generally useful way to understand the relationship of the complex sciences to the theory and practice of education. The dominant way of understanding the relationship between complexity and education is to see them as two areas of study and, using analogy as Stanley suggests, suspect that complexity theories can both guide our exploration and legitimate approaches to the field that would be difficult to justify from inside the more dominant analytic. The difficulty with this is at least twofold. As has been suggested, such a viewpoint fails to realize the value of tracing the full arc of the history of these ideas. But it also tends to

focus our attention on the vistas of complexity most distant from our own engagement; instead, it focuses us on what are arguably the *simplest* situations that exhibit complex outcomes. Subtly but definitely that point of view presses us to use conceptual frameworks that, while powerfully instructive, are also too simple to apply directly to educational concerns. Stacey's hesitations (cf. Stacey 2003, 50-51)—ones that point specifically to mathematical models of complex adaptive systems—and Prigogine's dissipative structures from the study of chemistry are well considered.

Education and the complex fields associated with mathematical chaos, chemistry and physics might be more usefully if loosely considered at opposite poles along a continuum (or continua) of complexity with education and the social sciences on the most multilayered, complex end and physics on the simplest. In between would lay the realms of ecology, biology, sociology and physiology. Those fields closer to education currently get scant attention while arguably richer in applicable models suited to our ends-in-view. Physiologically sophisticated understandings of cognition and emotion, for instance, are a burgeoning field of research with increasingly intriguing findings. For example, while the idea of "parameters" is most cleanly set out in the simpler complexity of complex adaptive systems (CAS) work, the more complex sciences of ecology and neurology yield more directly applicable versions of the concept in "ecological constraint" and "constraint satisfaction." It has been argued, for instance, that constraint satisfaction is the underlying principle powering recognition and learning more generally (Rumelhart, McClelland, and Hinton 1986)—an assertion with profound and generally disconcerting implications for learning theory.

This is not to say that the "simpler" complexities are not valuable, but the time may well have come for a more sophisticated borrowing and connection-making to the wider range of complex sciences. The simpler complexities help clarify the issues involved and make visible the underlying truth that complex material and indeterminant specific outcomes are not evidence of a field not susceptible to scientific inquiry. In fact, a complex approach is a conceptually more general way of pursuing the truth. In one example, it is possible to reconceive traditional causal relations as so tightly constrained that only one outcome is reasonable. Taking such an approach makes it possible to understand "causality" as a matter of degree rather than simply a matter of determination.

Education, then, is among the *most* complex of the complex disciplines; consequently, we have much to gain from expanding our understanding of complexity to include a wide range of subjects and a longer arc of time. Reflecting on Stanley's intriguing article gives us a path into the possibility.

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