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## Education and Complexity

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Teachers, researchers, policy makers, and educational managers are all very aware of the complexity of educational processes. Many involved in Education, however, often find it difficult to find a satisfactory language to describe and explore what they are engaging with, particularly in philosophical, theoretical and research terms. Complexity theory, with its focus on the dynamics of interacting systems, its attention to the specifics of local interactions, and its recognition of de-centred, multi-factorial types of causation, is generating increasing interest in this field.

The earliest work in Education which refers directly to complexity and dynamic systems theories appears to emerge in the 1980s in the work of Daiyo Sawada (1) and William Doll (2). Still earlier, however, researchers such as Lewis Elton (3) were questioning the possibility of cause/effect explanations in educational situations and arguing for many aspects of what would later be explored using complexity. Elton (3), for example, argues that educational research needs to 'attend to interactions' (p88); to shift its attention 'from events to relations' (p89), focus on the study of the uniqueness of particular situations, and develop 'a different attitude to time' (p90).

In the last ten years or so, a substantial amount of work in this area has been generated in North America. With the exception of William Doll, who is from the University of Louisiana, most of this activity has been generated in Canada, very often from the University of Alberta. Researchers such as Brent Davis, Dennis Sumara, Elaine Simmt and Rebecca Luce-Kapler have been exploring ideas from complexity in a range of areas which include classroom management, the curriculum, and teacher education. Much of this work has been done in relation to the teaching of mathematics. From a slightly different perspective, Tara Fenwick, also at the University of Alberta, has discussed complexity in relation to theorising in adult education (4).

The Complexity Science and Education Group, to which many of these researchers belong, maintains a web-site dedicated to complexity in education (5). This site has a listing of references related to complexity in general, as well as to Education, and also contains a link to a new Education and complexity journal entitled 'Complicity'. The site also hosts the proceedings of the Complexity Science and Educational Research Conference, which has been organised by the Complexity Science and Education Group for the last three years, and which has attracted about sixty (mostly North American) researchers on each occasion.

It would seem, then, that complexity theory is fairly established in relation to Education. From one perspective, as the above makes clear, this is true. However, knowledge and use of this work in mainstream education settings outside of North America appears to still be fairly limited. In contrast to the North American conference, which was, at least initially, targeted at an invited group of North American researchers, the call for papers for the Liverpool Complexity, Science and Society Conference was circulated to all major educational research organisations in the UK, as well as to research networks in Australia, New Zealand, South Africa and Canada. This resulted in about 40 abstracts, of which 25 were accepted as papers for the conference. Papers came from Hong Kong (x1), The Netherlands (x1), Canada (x8), Israel (x1), South Africa (x1), the USA (x1), Colombia (x1), New Zealand (x1), Australia (x1), Scotland (x3), Ireland (x1), and

England (x5). The papers covered the following areas: organisational behaviour (x1), e-learning (x3), mathematics (x7), philosophy/theory (x6), social regeneration (x1), classroom practice (x3; some of these overlap with the mathematics category), multi-lingual education (x1) and literary studies (x1) (6). There is also a growing body of work in Health and Social Care Education (7), though this generated only two papers for this particular conference.

The papers selected for this book explore perspectives on three different philosophical and theoretical aspects of Education, all of which have direct implications for educational practice. Deborah Osberg and Gert Biesta focus on the purpose of education and the nature of the curriculum. They argue that prevailing assumptions about knowledge and the curriculum rest upon an idea of Education as 'planned enculturation', which is underpinned by a representational understanding of knowledge and meaning. They discuss the possibilities opened up by replacing such understandings with 'emergentist' epistemologies, and explore the implications of seeing both knowledge and human subjectivity as emerging out of participatory action in the world. For them the idea of emergence opens up a way of thinking differently about Education as 'structured guidance' (rather than as tool for planned enculturation).

Tamsin Haggis looks at the contradictions and problems of conceptualising case study research in this field. She draws attention to the increasing theoretical interest in learning as a phenomenon which is 'situated', specific to context, and characterised by difference. She suggests, however, that this theoretical shift presents an almost insuperable challenge to dominant epistemologies, which are based upon an ontology which sees particularity as being either anecdotal or as an example of a larger classes or structures. Using complexity to reframe this underpinning ontology, she argues that a complexity perspective not only provides a rationale for the study of the specific and the particular, but that it suggests an imperative to research educational phenomena from this perspective.

Finally, Rebecca Luce-Kapler and Dennis Sumara explore the nature of consciousness in relation to the study of literature. Starting from a discussion of consciousness as an emergent phenomenon, they look at the potential role of literary study in developing the 'mind-reading' necessary for awareness of self and others in interaction.

## References

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