Reflections on the Fourth Exeter Complexity in Health and Social Care Conference September 22-24, Exeter University

We learned the difference between winking and blinking (the former is intentional, a crucially important feature of human behaviour); about Trojan mice (small ideas planted into organisational communities that assist and support change processes); and that Chapter 17 of John Steinbeck's *East of Eden* is probably the first literary description of a complex and evolving system. And, when relaxing over coffee, we could enjoy the exhibition of complexity paintings by Surrey-based artist Mateo Willis — backed up by his engaging parallel workshop on the last day of the conference.

These were just some of the delights of the fourth Exeter Complexity in Health and Social Care Conference, held last month in the autumnally splendid grounds of Exeter University. Generously supported by the Modernisation Agency, and organised by the Health Complexity Group at the Peninsula Medical School, the conference began in its now time-honoured way, by presenting a taster session on the basic principles of complexity; its historical origins in mathematics, biology and meteorology; and some contemporary examples of its application in health and social care. Keynotes presentations by Professors Mitelton-Kelly and Bevan, of the London School of Economics and the Modernisation Agency respectively, on the first day were matched by a glittering exploration of the epistemological basis for complexity by David Snowden, polymath head of the Cynefin Institute (formerly the IBM think tank, now an independent organisational consultancy).

What's it all about, then? Complexity is a helpful way of understanding how the world out there evolves. Its theory challenges the dominant scientific paradigm, which has held sway since the time of Descartes and Newton. Where traditional science works by breaking down systems or entities into ever smaller components for the purposes of analysis, complexity seeks to focus on the relations between elements of systems, irrespective of the nature of these elements. Where traditional science is forced to work with artificially closed systems, in order that its equations of motion, for instance, remain calculable, complexity explicitly works with open dynamic systems. As a consequence, a key phenomenon in complexity is the 'co-evolution' of a system with its environment or context. This co-evolution will, typically, be a consequence of the positive feedback loops that occur in the system's interaction with its environment, whereas traditional mechanics and systems theory tends to be limited to negative feedback loops.

So, Professor Mitleton-Kelly reminded us, the notion of distribution in leadership, knowledge, and power is key. Leaders in complex systems lead by dispersing their power across their system (that is, their organisations). Helen Bevan showed us how leaders in complex systems see relationships as the essential building blocks of good decision making, with expertise residing in those with most knowledge (as opposed to power) in the system. And Dave Snowden took us through the distinction between ordered rule-based systems, like business re-engineering, and the heuristic, unordered systems of social complexity.

Irrelevant? Of no interest to medics? Tim Holt, a general practitioner now with Warwick University presented his rapidly developing ideas on complexity and cardiology, based on his non-linear modelling of diabetes. Adaptive prediction modelling will help us target primary prevention at high-risk individuals, and, using continuous time series data sets, feedback of data on cardiovascular disease development will enable us to tailor interventions more appropriately to individuals and adapt those interventions over time. Much of his ground was covered in an introductory article in this journal,[1] and expanded in his edited book, *Complexity for Clinicians*.[2]

A convention in the conference is to allow one complete session as free space, giving the delegates an opportunity to decide, in a plenary conversation, the kinds of things they would like to talk about in small groups. They then spontaneously form such groups in order to have those conversations. In itself, this session imitates the early stages of a complex system, which self-organises into the groups decided by the delegates themselves, and is, therefore, inherently unpredictable at the outset. Apart from taking about 10 years off the plenary session facilitator's lifespan (believe me, this was my third effort), these sessions succeed in mixing up the delegates; relaxing the atmosphere; and generally encouraging a friendly ambience in plenary, parallel, and small group sessions alike. Thus, our delegates from Spain and Canada were able to mix with members of the Modernisation Agency, general practitioners, management consultants, philosophers, social care professionals, artists, healthcare managers, and patients. Bring on another conference next year, the feedback forms said!

Convinced? If not, a good way into complexity is through Gleick's classic book, *Chaos*[3] or the more recent *Complexity and Healthcare: an Introduction.*[4] Complexity thinking pervades the other sciences, and it is about time medicine woke up to it.

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References
1. Holt TA, Ohno-Machado L. A nationwide adaptive prediction tool for coronary heart disease prevention. *Br J Gen Pract* 2003; **53:** 866-870.
2. Holt T (ed). *Complexity for clinicians.* Abingdon: Radcliffe Medical Press, 2004.
3. Gleick J. *Chaos: making a new science*. New York: Penguin, 1988.
4. Sweeney K, Griffiths G (eds). *Complexity and healthcare: an introduction.* Abingdon: Radcliffe Medical Press, 2002.