Chapter 98
Managing Complex Adaptive Social Systems

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Category: Social Aspects of Knowledge Management

INTRODUCTION

Complex Adaptive Systems, for our purposes, are social systems that that evolve and display new, emergent properties, and self-organizing behavior of their components; they are based on a reasonably stable infrastructure, on the satisfaction of the most basic needs, and flexible, frequent, and open communication and interaction.

Complex Adaptive Systems may be based on a few, simple rules, but can yield complex and unpredictable outcomes. The 'Hole in the Wall' project is an interesting case in point in the design of spaces for complex adaptive systems, or complex adaptive networks. In this project, touch screen computers were literally put in 'holes in walls' in places where unschooled children congregated. The children were given no instructions on how to use the computers, or what to do with them, but with startling results: the children soon taught themselves how to use the computers and the Internet, and much more (Mitra, 2003).

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BACKGROUND

Complex systems may display *de-volution*, in addition to *e-volution*, i.e. the system, or organism may return to a previous state if the full ensemble of capabilities is no longer required. Our lack of

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ability to produce our own vitamin C is a case in point. The relatively recent habit of embarking on extended ocean journeys in very basic three masted ships highlighted the cost of that particular 'devolution' rather painfully (Deacon 2004). Homo Sapiens did well gathering berries on land, but struggled in early ocean exploration, and many people died of scurvy.

Such cases of 'devolution' highlight the fact that ecological adaptation does not inexorably lead to an increase in complexity. Complex adaptive systems are essentially *adaptive*, rather than more and more complex. Traffic roundabouts (or 'circles') are useful exemplars of the application of complex adaptive systems in designing for managing complexity, as traffic lights are inherently more complicated, and inflexible. If the world is becoming more and more *complicated,* the emergence of global digital networks might provide the appearance of insurmountable complexity, but also the necessary infrastructure for the *complex adaptive networks* that can assuage that problem.

Knorr-Cetina makes out a detailed case for this scenario. She writes that this is possible because of the institutional 'lightness' of recently emerged *complex global microstructures.* And by 'lightness' she means "the mechanisms and structures involved suggest a reversal [a 'devolution' one might say] of the historical trend towards formal, rationalized (bureaucratic organizational) structures". She points out that this involves a major shift, to complex adaptive systems, and that the result is "a certain non-Weberian effectiveness [which] relies to a far greater extent than hitherto on the systematic and reflexive use of systems of amplification and augmentation [which] seek to exploit the potential for disproportionalities between input and output or effort and effect" (2005:215-216). In short, big inflexible 'rationalised' structures give way to networked, micro-global adaptive structures.

The challenge in managing complexity might be met if we use current social and systems theories, along with social networking and social software, and integrate them into a theory of *complex adaptive networks*, to address the consequences of the over-complicated and over-rationalized systems we developed in the modernist industrial era.

The nature of the Information Age was, to paraphrase Toffler, to increase the component of information that was embedded in systems and artefacts. However the nature of the Knowledge Age is to change the very nature of that relationship, from one of 'embedding' to 're-programming', and from 're-programming' to 'networking', arriving at what might be called the Age of Transparency, where transparency, and no longer just knowledge, is power: the projection of power is now, more than ever before, a function of your siting (and thus your line of sight) within interactive and communicative networks, and the speed and capacity of your access to those networks. It has even been said that 'speed is the new digital divide'.

Your individual affordances can change radically with changes in your access to, and your exploitation of, communication networks and the extent to which they are transparent to you. This applies equally to networks of power, as demonstrated in the SALT negotiations (Strategic Arms Limitations Treaties), which were only possible because of the increased level of mutual surveillance and transparency available to both sides in the Cold War (see below).

FROM EMBEDDING KNOWLEDGE TO NETWORKING

Let's have a more detailed look at the changes in the process of embedding knowledge …

Embedding is a one-way process, and is typically 'cast', 'once and for all' in the monuments of Modernism: iron and steel ocean liners, steel-reinforced concrete bridges and highways, and steel and glass skyscrapers.

Programming increases the ratio of information or knowledge in the mix, and starts to disengage

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