

Event Learning Points

Event Title	New Insights from the Natural Sciences on OD & KM <i>A CSC Managing in Complexity Series Seminar</i>
Date	15 July 2010
Presenter	Mr Dave Snowden Founder and Chief Scientific Officer of Cognitive Edge Founder of the Cynefin Centre for Organisational Complexity



Organised By	Centre for Organisation Development (COD), Civil Service College
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These key learning points are captured as part of the contributions made by the speakers and participants during the event. The key objective of circulating the event learning points report is to share the contents delivered during the session so as to perpetuate the discussion beyond the event.

Click here to access the [podcast](#) and [seminar slides](#).

1. Event Background

Mr Snowden gave a lecture on “New Insights from the Natural Sciences on Organisation Development (OD) & Knowledge Management (KM)” at a seminar organised by the Centre for Organisation Development (COD) for OD and KM practitioners.

2. Presentation Highlights

Mr Snowden began by introducing the term “Distributed Cognition”, a key concept in the field of natural sciences. Distributed cognition is akin to the “wisdom of the masses”. This is found in human sensor networks shared by different individuals, with deep tacit knowledge and experiences of a particular domain.

He also distinguished distributed cognition from distributed decision making. He advocated that complex situations require centralised decision making by an individual for a select group. At the same time, he clarified that centralised decision makers utilise the creation of large human sensor networks to sense-make data and solicit feedback.

Distributed cognition is essential because it helps counteract insidious effects that negatively influence the individual’s ability to process information in an objective and rational manner. Examples of these effects include cognitive biases and inappropriate use of heuristics.

Defining Systems and Agents

Mr Snowden explained and defined the following key terms from the perspective of natural science theory.

- “System” - any network that has a form of coherence. However, he highlighted that networks may also be fuzzy (i.e. possessing no pre-given set of boundaries or structure).
- “Agents” - existing and acting within the system, which are represented by ideas (i.e. myths) and people. He added that dominant ideas can become key organising principles in groups.

He introduced three types of (human) systems:

1. Ordered: Agents exhibit highly predictable and constrained behaviour.
2. Chaotic: Agents are fully unconstrained. They make independent decisions and possess no connectivity. As such, these systems can be managed through statistics and probability.
3. Complex: Agents are lightly constrained by the system. The agents in turn modify the system as they interact with it.

Understanding & Managing Complexity

Mr Snowden presented the 'principle of co-evolution' between agents and the system as a key concept in understanding complexity. Co-evolution occurs as agents interact with and modify the system in an irreversible process. This process is unpredictable because no meaningful relationship or casual effect can be determined. As such he advised that identifying present solutions would be more viable as opposed to planning for future interventions. The adoption of safe-fail experiments to establish emergent patterns was also recommended, where desirable emergent patterns can be subsequently amplified while undesirable ones can be dampened. The lack of predictability also highlights the need to *utilise distributed cognition processes in managing the complex system.*

Characteristics of the complex system:

- Highly sensitive to small changes
- Proximity and connectivity of agents has high impact
- Danger of retrospective coherence and premature convergence
- Hindsight does not lead to foresight (*Shift from fail-safe design to safe fail experimentation*)

Heuristics¹ in managing the *complex system*:

- Use of distributed cognition (*Wisdom but not foolishness of crowd*)
- Work with finely granulated objects (*Making sense and connection of information and organisational meanings*)
- Disintermediation² (*Putting decision makers in direct contact with raw data*)

Mr Snowden encouraged the Public Service to recognise and harness the potential of being better able to manage complexity as it may result in the ability 'to do more with less'.

Mr Snowden also emphasised that failures are inevitable in a complex system, which makes necessary the need for resilience-building. Tolerated failure imprints on human beings at a rate faster than success, i.e. people learn better from failures than successes. The key is therefore not to eliminate failure but to minimise impact through early detection and fast recovery. This would require processes that enable people to think differently in the face of failure.

In assessing situations, Mr Snowden highlighted that those possessing either "unknown knowns" (i.e. knowing what to do but not knowing the situation) or "known unknowns" (i.e. knowing the situation but not knowing what to do) as potential danger areas to navigate within. This is because in either case, the likelihood of being misled into making wrong decisions is high. In complex situations, the role of experiments is to allow us to treat success and failure as indicators, which in turn informs decisions on whether to amplify or dampen the intervention being experimented on. This instils a disciplined process of conducting experiments with intentionality and informing policies to amplify success when the experiment produces the desired effect. He added that such an approach would be cost-effective and efficient, as it prevents over-investment in trying to identify the elusive ideal strategy.

¹ Heuristics are simple, efficient rules, hard-coded by evolutionary processes or learned, which have been proposed to explain how people make decisions, come to judgments, and solve problems, typically when facing complex problems or incomplete information.

² The removal of the middleman or intermediary.

Managing Knowledge and People in Complex Systems

Mr Snowden shared seven guiding principles of Knowledge Management (KM) based on how people cognitively process knowledge. The seven guiding principles are:

1. Knowledge can only be volunteered; it cannot be conscripted. *People will hide or disguise knowledge if forced to share.*
2. We only know what we know when we need to know it, we are pattern-based intelligences, not information processors. *Our knowledge is based in context and not in abstract.*
3. In the context of real need, few people will refuse to share their knowledge. *On the contrary even when individuals operating in a silo environment anticipate the need to share information, it does not happen as well because people do not feel connected with each other.*
4. Tolerated failure imprints learning better than success. *This is the basis of apprentice models of learning – we learn better from failure.*
5. The way we know is not the way we say we know. *Immediate memory works differently from reflective memory in the human brain, because joint-up thinking processes also take place.*
6. We always know more than we can say, and we will always say more than we can write down. *Writing is a very limited capturing mechanism of knowledge.*
7. Everything is fragmented, humans seek messy coherence. *There are limits to the semantic web³. Human beings can sense pattern that semantic webs cannot (i.e. Finding answers via Twitter vs. Google).*

Mr Snowden expounded on the concept of narratives. Narratives are a knowledge sharing medium unique to humans. In the military context, powerful metaphors in the form of command languages comprise of a few words but allow for the transfer of complicated ideas. Narratives yield power because people tend to remember stories rather than processes. Building narrative-based decision support systems would therefore work in line with the way the human brain has evolved.

³ Semantic web describes methods and technologies to allow machines to understand the meaning - or "semantics" - of information on the World Wide Web.

Mr Snowden also briefly mentioned the following techniques that can be employed in managing a complex system:

1. Social Network Simulation (SNS)⁴

This method allows people to self-form teams across silos, replicating the way in which informal networks form in the real world. A series of intractable problems are self-declared, and teams, based on self-declared rules, are built to solve them. This serves to break-down organisational silos and solves knowledge management problems.

2. Crews⁵

Crews are a formal structure comprising members trained in specific roles, with a set of expectations. This means that crews can be easily dismantled yet also rapidly assembled. They also possess the ability to delegate authority without loss of status. Within a crew, boundaries have to be rigid in order to be deployable. With these specifications in place, crews can be formed across silos and boundaries without members needing prior knowledge.

3. Anthro-simulation⁶

Anthro-simulation is a complexity-based simulation environment that creates a tolerated environment for failure through strategic experimentation. People are trained in environments to fail rather than succeed, based on the premise that people learn better from failures.

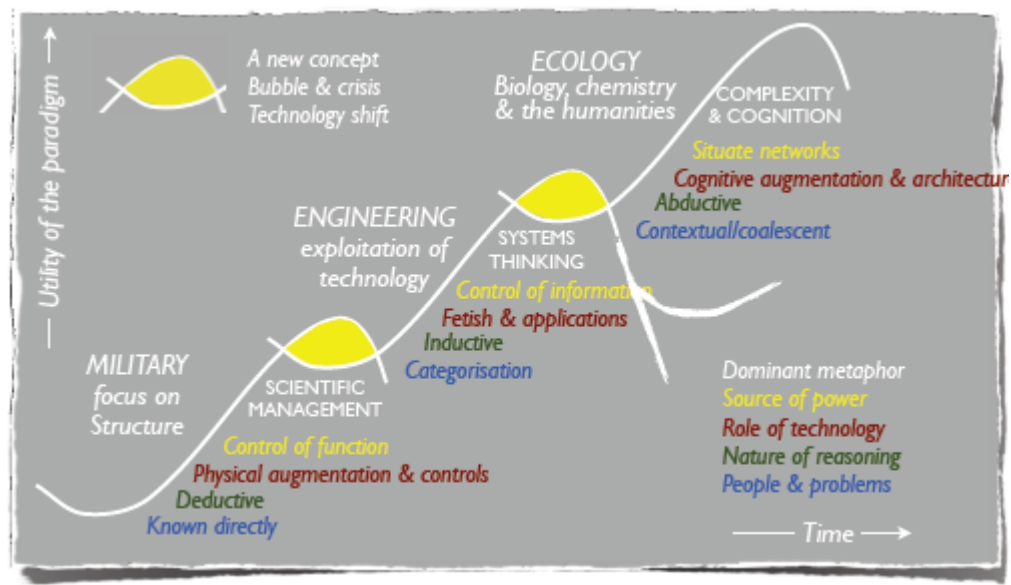
⁴ See <http://www.cognitive-edge.com/method.php?mid=43>

⁵ See http://www.cognitive-edge.com/blogs/dave/2007/11/are_you_on_the_bully_watch.php and http://www.cognitive-edge.com/blogs/dave/2007/11/aggregative_or_emergent_identi.php

⁶ See <http://www.cognitive-edge.com/methodprint.php?mid=38>

Utility of the Paradigm Diagram

Lastly, Mr Snowden introduced a diagram that mapped the evolution of three paradigms⁷ across two axes: 1) utility of the paradigm, and 2) time.



The paradigms are positioned with regard to their 1) dominant metaphor, 2) source of power 3) role of technology 4) nature of reasoning 5) people and problems.

Mr Snowden shared that over the course of time paradigms typically develop through an S-curve cycle. He highlighted that the challenge of a new emerging paradigm is the resistance posed by the preceding paradigm. While this preceding paradigm may be the current dominant paradigm (relative to the emerging one), it is also one that is beginning to lose its relevance and effectiveness. He emphasised that the ability to shift from the dominant paradigm to the emerging one is crucial. As such, the shift in adopting a complexity paradigm is one that will be critical for the Public Service.

⁷ A paradigm refers to "a philosophical and theoretical framework of a scientific school or discipline within which theories, laws, generalisations and experiments performed in support of them are formulated".

3. Discussion

Following Mr Snowden's presentation, a number of questions were raised. The key points were captured as follows:

Question #1

What will organisations in the future be like?

Companies will become smaller, more networked, and adapt very quickly. Human networks will also become hugely powerful and increasingly supported by technology.

Question #2

How should one apply complexity to the management of internal quality processes within an organisation?

We need to develop the practice of measuring attitudes. Attitudes are a lead indicator, while quality compliance is a lag indicator. The focus should not be in getting people to adhering to rules, but in changing the environment to encourage desired results.

Question #3

How should one use narratives in an organisation?

We should first distinguish "narratives" and the current "story-telling movement". The story telling method is about telling stories with the use of facilitation. In contrast, narrative capture is about collecting data from individuals and does so without facilitation. The narrative capture approach can be use in complement with the use of quantitative statistics, in order to provide more robust and convincing analysis of data.

Question #4

How should one deal with self-censorship in data collection?

People self-censor data and information all the time. In fact, societies that explicitly record their values have already lost it. In an ideation-based culture, we know the way we do things but we don't articulate how. A possible solution is to allow anonymity – this can radically reduce but never completely eliminate self censorship.

4. Key Learning Points

1. Different approaches are needed in managing complex systems as compared to ordered ones. To apply approaches that have worked well in ordered systems in complex ones would not yield the same results.
2. Ways to manage the complex system include:
 - Situate human sensor networks to gain power.
 - Move from fail-safe design to safe-fail experimentation.
 - Provide flexible and negotiable boundaries for safe-fail experimentation.
 - Detect weak signals early. Amplify those that are desirable and dampen those that are not.
 - Create processes to force people to think differently and innovate.
3. Conventional approaches to KM should be reviewed taking into consideration new insights on how people cognitively process information and knowledge. Taking into account the seven guiding principles of KM proposed by Mr Snowden would be a good start point in reviewing KM efforts.