


The Intranet as a Complex Ecology

David Snowden, The Cynefin Centre




creative commons
COMMONS DEED


Attribution-NonCommercial-NoDerivs 2.0


You are free:

- to copy, distribute, display, and perform the work

Under the following conditions:

 **BY:** **Attribution.** You must give the original author credit.


 **Noncommercial.** You may not use this work for commercial purposes.

 **No Derivative Works.** You may not alter, transform, or build upon this work.

- For any reuse or distribution, you must make clear to others the license terms of this work.
- Any of these conditions can be waived if you get permission from the copyright holder.

Your fair use and other rights are in no way affected by the above.

This is a human-readable summary of the [Legal Code \(the full license\)](#).

[Disclaimer](#) 

The full copy of the CC licence is available www.cynefin.net – knowledge base.

The Intranet as a Complex Ecology

David Snowden
Founder
The Cynefin Centre
www.cynefin.net

Chaos and order are common bedfellows in the digital economy, both originate in each other but neither are appropriate destinations for a progressive organisation. They are both opposite poles of a false dichotomy between 'managed' and 'unmanaged' that underpins most organization thinking: from the starry heights of strategy to the day-to-day integration of content sources in the organisation's digital information exchanges; intranet, extranet or whatever, the issues and the confusions are the same. We live in an age of considerable uncertainty, in which society is undergoing a shift in the way it defines itself. Various described as globalisation, the networked economy and "eAnything" this revolution in thinking is driven by the speed of information flow and the exponential growth of connections between individuals, cultures and communities. That revolution requires us not just to create new business models, but also to change the way managers think.

The bounding of Scientific Management

Management thinking in the twentieth century has been dominated by the ideas of Frederick Taylor, the founder of scientific management together with his various successors and followers who applied the principles and practice of Newtonian Science to the organisation and society. The basis of Taylorism is clear. Detailed study leads to the creation of a generalised hypothesis, which can be tested and from which prescriptive models can be derived and actions taken. As with Newtonian Science the assumption is that there are underlying universal rules or principles awaiting discovery. Like Newtonianism, the presumption is that *cause* is separated from *effect* and the relationships between effects and their causes are knowable. The attractiveness of this is obvious; if we know the relationship between cause and effect, then by manipulation of *cause* we can determine *effect*.

Scientific Management assumed, and still assumes, that study of actual or historical practice can lead to the discovery of such laws, generally ones of associative qualities: five enablers of knowledge creation (von Krogh et al 2000); Level 5 Leadership (Collins 2001); Five proven methods for making knowledge sharing a reality (Dixon 2000) to name three recent examples. Now all of these approaches are useful, if we see them as providing different perspectives on business issues through descriptions of past practice. As indicators of directions that a journey might take they are useful; as prescriptive models that can determine future behaviour they are dangerous. To be fair, two of the above authors would reject the concept of prescription, but that is how their work will be used by too many managers and consultants. What worked for leaders in the past is useful knowledge, but it does not follow that it will work for leaders in the future, in practice it repeating past "best practice" has often led to a dangerous complacency. The academic or consultant may have missed some hidden or tacit aspect of behaviour, or missed a vital aspect of the context: many leaders are only great because they are lucky enough not to live in "interesting times" to quote the Chinese Proverb.

Knowledge management, triggered, and the growth of digital communication confirmed, the limitations of scientific management, just as Quantum Mechanics and the Principle of Uncertainty bound Newtonianism in its applicability. We now need to understand the application of a new scientific metaphor to management: the science of complex adaptive systems. Complexity is sometimes confused with Chaos theory, which is a

misleading link. Chaos is the science of turbulence; Complexity is the science of multiple connected and interdependent, interacting agents.

Complex contrasted with Complicated

One way to understand this difference and in consequence the need to bound Scientific Management, is to distinguish systems that are **complicated** from those which are **complex**. An aircraft is complicated, it contains many parts with many relationships, but all those relationships are known or knowable. If I take an aircraft apart into its various components and reassemble it, then it is the same thing: the whole is the aggregate of the parts. Now contrast that with any community, virtual or otherwise composed of human beings. This is complex, each of the agents is constantly interacting with all the other agents; in terms of motivation, emotion and reasoning, interactions are also taking place within the agent; all of this leads to a highly complex network of communications. If you try to take a complex system apart, or even subject it to analysis, then it changes as a result of the exercise, and changes again as it is put back together. The number of connections mean that it is never stable enough to sustain analysis, and the whole is always different from the sum of parts: note different, not necessarily greater, it may even be less.

Managing complex systems is radically different from managing those that are complicated. Cause is intertwined with effect, and the sheer number of connections means that predictive rules are not available, no matter what level of study is undertaken. While the metaphor of a manager in a complicated environment is that of the mechanic, in the case of complex systems a gardener would be a more appropriate role model. You can dig the soil, fertilise it, plant seeds and nurture the garden over a year, but many things may conspire to frustrate your efforts and the outcome is inherently uncertain and unpredictable. For a complex system we need to create an ecology; this is achieved by drawing boundaries between spaces to reduce uncertainties and intervening to encourage growth, such interventions are best if they take the form of simple actions that organically evolve into complex and hopefully desirable forms of behaviour.

Implications for Intranet design

Any intranet, or for that matter any extranet or eTrading on the Internet is a complex system by virtue of its very nature; it comprises many levels of interaction through multiple use, in which issues of trust in the material and its source are important. The interactions of many people give rise to new knowledge being created in chat areas, usage statistics result in funding priorities for different areas; those interactions result in new relationships being formed between actors. Some individuals may participate and contribute to the intranet under duress, either for reasons of time or though fear of abuse (Snowden 2000a). Attempts by the organisation to force participation may result in defiance or camouflage behaviour, which in turn impacts on levels of trust and one to one validation. Enough! An Intranet is complex not complicated.

There are some basic issues that we have to be aware of, although the following list is not intended to be exhaustive.

- **Context is more important than content.** Too many intranets focus on content assuming that the context will look after itself. Polanyi in 1962 made us aware that we always know more than we can tell, and by extension we can always tell more than we can write down. The process of going from my head, to my mouth, to my hands, involves an inevitable partial loss of content, but principally context, with significant impact on usability.
- **Privacy is key in an organisation comprising volunteers rather than conscripts.** This is an increasing issue in organisations and the need for privacy in virtual environments is growing with its lack constituting a form of abuse. Many

experts have ceased to be experts as their declared expertise results in so many requests for help that they cease to practice. Others wish to choose who receives their knowledge, not out of some perverse desire to exercise power, but out of genuine fear of how the material will be used or more likely abused, when it falls out of their control. Failure to recognise that contributions to intranets are generally voluntary can easily lead to camouflage behaviour as individuals conform by providing some token gesture of material, but retain valuable learning for trusted recipients. (Snowden 2000a).

- **Learning is more important than order and structure.** Intranets evolve over time, what matters, is that they create a learning environment, not that they are neat and tidy. Look around an office and observe the different working styles, some desks appear chaotic, but are fully usable by the desks occupant, others are immaculate: different people and different communities have different styles, one size does not fit all. The trouble with "systems" built with technology is that people seek order, often at the cost of usability and adaptability. Without a level of requisite variety, ecologies stagnate and die.

Application of these principles requires a switch in thinking from that informed by the construction of enterprise wide resource planning systems and the like. Some illustrations of possible approaches will best make the point. Again these are not exhaustive, neither are they prescriptive models that provide either necessary or sufficient conditions of success; they are examples of interventions that are consistent with treatment of an intranet as a complex adaptive system.

Just in time knowledge management (JIT)

An intranet does not have to confine it self to formal space, it can also provide the environment for informal communities to form, reform and dissolve as necessary. In practice such informal communities, which may range from public to secret in their profile, provide a rich and fertile source of knowledge and learning that is too large and complex to be formally managed. One study of actual practice in IBM Global Services (Snowden 1999) indicated some 50-60 official areas, complimented by many tens of thousands of private areas. This offers enormous potential. By providing a space in which members of an organisation can naturally share with people they trust we create a fertile source of learning. What then matters, is to move this knowledge into the formal space on a just-in-time basis: knowledge when it is needed. Techniques to achieve this include subject matter flagging and privacy ensured searching of content. The former works by triggering requests from the formal to informal and invoking social responsibility as a motivation for knowledge exchange, when it is needed. Most individuals are happy to volunteer material when it is asked for, it is the needless codification of material that may never be used which leads to frustration and non-compliance. The latter may be best handled by a third party, but involves a computer program searching the content of private spaces for traces of specialised knowledge, not revealing that content, but listing e-mail addresses of individuals who can be asked to help, or better still posted anonymous requests to see who is prepared to **volunteer**. The issues here are those which gave rise to JIT in manufacturing some decades ago: organisations realised that the cost of maintaining stock on the factory floor was out of all proportion to the benefits with high levels of wastage over and above stock holding costs. In consequence stock holding shifted back to the suppliers, entering the factory just-in-time.

Cyborg Interfaces

Much is made of the need to personalise portals, but too many organisations assume a purely machine interface on grounds of automation and uniformity. Once we understand the volunteer nature of knowledge, then it is worth looking at the various eTaylors for examples of how to build an interface. After all visitors to an eTaylor are volunteers, they choose to enter and choose to return: there can be no compulsion. Models that

work for eTaylors are more likely to work in the case of internal knowledge exchange. A good example of this is the Landsend web site. Here visitors are able to click a button which results in them being phoned by a human being. They are then able to ask a human question and be guided round the web site to possible answers. This is aided by the use of avatars in which the customer can see the clothes on their own body shape rather than some idealised model. If we look at what is going here, two things stand out.

1. The human agent is able to manage the ambiguity and cultural context of the enquiry in ways that event the most advanced search engine could not. By navigating the customer round the system that customer is trained in practice, by example and in consequence will reduce dependency on the human agent over time.
2. The human agent is accessed through the system, not independently of it, which means that the system gets the credit. Any use by the human agent of computer intelligence to present the "right" clothes to the customer for potential purpose is hidden or accepted.

Apply those lessons in a corporate intranet and we gain a different perspective from conventional system design. By including human agents we are able to manage the complex aspects of the system by using a processor designed for complexity: the human brain. In consequence the expense of a complicated system in which all options and possible uses have to be anticipated is radically reduced. By observing how the human actors are used we can evolve our design over time to improve its usability, without a series of disgruntled attempts to work around the system by finding a person to help: people are available through the system. This is just one example of a general principle: go to a site where people only visit because they want to, and then use the features of that in the design of your intranet. You face the same problems: compulsion will not work.

Look to the Ants and other social insects

Ant nests are examples of complex systems. Contrary to popular myth they have no central command and control system based on the queen, whose function is confined to laying eggs to order. Ants self organise, as do bees, based on social interactions and social signals of varying degrees of complexity. Most Intranet designers and managers would benefit from reading a basic text book or two on insect behaviour, and if they threw in some social and cultural anthropology we might get systems for both technologies and processes that are more responsive to human needs. Some examples of the use insect behaviour in intranet design include mapping of usage by leaving digital messages that decay over time and provide a trace of the passage of a transaction or communication. This allows other messages to either reinforce, by association with a strong path, or explore, by following weak ones. Cluster of like with like in community formation can be supported by swarming: just as bees nurture a new queen in the hive, then swarm around that queen, so ideas, concepts or activities can be used to create swarming points in virtual space. When a swarm of bees forms it is coherent as a physical cluster for a period of time; if the beekeeper is alert he can enclose the swarm and place it in a hive to be productive for his or her benefit. The same applies for community formation. If interest gathers around a swarming point that group can be reinforced, bounded and put to productive use. Rather than forming interest groups by "rationally" determining which groups should exist, the organisation should focus on creating swarming points to try and induce those groups to form naturally: if you can't create a swarm, then you can't create a sustainable community in the long term. You may also be surprised at what you discover, new sources of innovation and association of ideas and concepts that provide new and richer learning.

Privacy in Expertise location

In many cases use of content in corporate intranets is confined to trawling documents for the names of authors who can then be contacted by phone (Erickson & Kellogg 1999). Effectively the investment in content is being wasted as users search for context. Software packages now exist that recognise this by trawling e-mail records for evidence of expertise. E-mail is a much-undervalued source of knowledge. However, the more advanced systems also recognise the right to declare privacy. When searching such systems an enquirer receives a list of those who are happy to allow their expertise to be known, but are unaware of those who have chosen privacy. However, the private owner of knowledge is advised of the enquiry and from whom it originated. This is a very small intervention that gives rise to highly complex and moral behaviour. To take a practical example let us take a hypothetical experience. The author is an 'expert' in organisational story telling, let us assume that in the above case this expertise has been designated as private, the motivation being fear of abuse of a powerful tool by individuals unprepared to serve a proper apprentice. A colleague John seeks story expertise, but John is known as a stealer and abuser of other peoples knowledge: blaming them for the failures arising from his abuse, claiming the credit if by luck it works. In this case the knowledge will be withheld and probably hidden. The next enquiry comes from Philip. Unlike John, Philip has a reputation and track record of taking innovative ideas, granting full credit for the success and sharing the blame in the event of failure. Here the response will be to phone Philip immediately. The complex impact is that Philip will gain more access to organisational knowledge than will John. In a more traditional organisation the political skills of a John would outweigh the moral integrity of a Philip.

Conclusion

Some examples have been provided, these are not complete, or exhaustive, they are illustrations of a different way of thinking, that moves from treating human interaction as complicated, to a recognition of its complex nature. Other examples could have been quoted and the following will be the subject of future articles:

- The role of story telling to re-supply the context often lost in eLearning (Snowden 2000b);,
- Visualisation techniques derived from anthropology and archaeology to engender a sense of social responsibility in virtual communities; ,
- The application of principles of a peoples bank in Bangladesh to building trusted communities in a western society
- Oral History intranets that allow the development and evolution of complex understanding and the organic growth of accessible organisational memory.

The digital age and the consequent connectivity of people and communities creates complexity, but that complexity still has to be managed. This means focusing on small interventions that grow and build into complex behaviours. It means drawing boundaries to reduce uncertainty and provide safe havens to protect and nurture new ideas and thinking (Snowden 1999). It means recognising the value of both virtual and physical collaboration and knowledge exchange, not replacing one with the other, but using both as appropriate.

This article started with a reference to the profound changes caused by increased flow of information, and identified the failure of thinking based on Taylorist concepts of Management Science to adapt to this new age. This situation is not new, the strongest parallel in our history occurred when the European invention of the printing press was combined with the secret of making cheap paper, stolen from the Chinese. That linkage and the resulting capacity to propagate knowledge far more widely and quickly than had ever been possible before gave rise to the enlightenment. It enabled the reformation

and resulted in one of the most profound shifts in collective human understanding since the shift from hunter-gatherer nomads to farming in pre-history. When a society lives through a change this profound many if not all of its mental models and conventional or received wisdom fail. However the investment of the previous owners of collective wisdom in their position and status is not easily surrendered. What was true for the Office of the Inquisition attempting to preserve a terra-centric view of the universe applies equally to the modern Business School or Management Consultant generalising qualities of leadership, innovation or whatever from a partial and historically determined sample. A new age calls for a new model, but change is disruptive, painful and not without its casualties, a problem recognised in the Bible: "...Neither is new wine put into old wineskins; if it is, the skins burst, and the wine is spilled, and the skins are destroyed; but new wine is put into fresh wineskins, and so both are preserved." (Matthew 9,17)

References

Collins, J. (2001) Level 5 Leadership: the triumph of humility and fierce resolve. *Harvard Business Review* 79(1) January 2000, 67-76

Dixon, N. (2000) *Common Knowledge*. Boston: Harvard Business School Press

Erickson, T. and Kellogg, W. Towards an Infrastructure for Knowledge Communities" position paper for the ECSCW '99 Workshop *Beyond Knowledge Management: Managing Expertise*

Polanyi (1962) Terry Lectures at Yale University republished in 1983 by Doubleday & Company as *The Tacit Dimension* ISBN 0-8446 5999-1

Snowden, D.J. (2000b) Story Telling and other Organic Tools for Chief Learning Officers and Chief Knowledge Officers. In *In Action: Leading Knowledge Management and Learning* ed. Bonner, D ASTD (www.astd.org)

Snowden, D. (2000a) Organic Knowledge Management three part article in *Knowledge Management*, Vol. 3, No. 7, April 2000 pp. 14-17; Vol. 3, No. 9 June 2000 pp. 11-14; Vol. 3, No. 10, July/August 2000 pp. 15-19.

Snowden, D. (1999) Liberating Knowledge. In *Liberating Knowledge the CBI Guide to Knowledge Management*. London: Caspian Publishing. 9-19

Von Krogh, G., Ichijo, K & Nonaka, I. (2000) *Enabling Knowledge Creation*. New York: Oxford University Press