

# Researching Practice or Practicing Research: Innovating Methods in Healthcare - The Contribution of Cynefin

*Annabelle Mark and David Snowden*

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## Introduction

Innovation in healthcare for many is what medical progress is about and is the subject of many scientific articles in learned journals. However, the majority of these relate to the innovation of treatment and treatment regimes for patients rather than the organizations that deliver them. Increasing awareness of the need to enable the organizations to keep pace with developments in technology in the UK was at the heart of the UK government's work across all departments in the early 1990s. This can be seen both in the setting up of the Performance and Innovation Unit in the Cabinet Office in 1998 and the subsequent paper on Modernising Government (UK Cabinet Office, 1999). These developments gave clear indications of the strategies that would be important and were at the heart of the government's intention to improve public services. This has been described as a move away from the staged school to the process, or management of innovation school confirming the complex and often idiosyncratic nature of innovation in organizations (Walker, 2003).

The set of assumptions set out by government is also at the heart of the Science and Innovation Strategy issued by the Department of Health in 2001 (UK Department of Health, 2001) and many of these had implications for the organization of health care. For example, it has resulted in new organizational forms such as NHS Direct. This is a 24/7 computerized evidence based decision support system to provide information to patients at all times and increasingly to provide access to appropriate care out of normal working hours (Mark and Shepherd, 2001). As part of this ongoing response to the need for strategic innovation in health and its organization in the UK, the Science and Innovation Strategy has set a number of goals:

- To ensure that science and innovation lead to improved interventions for health and social care.
- To ensure that they work with partners to sustain and develop the science base in health and social care.

- To ensure that policy and practice in health and social care are based wherever possible on sound science and research.
- To ensure that the rights, health and safety of the public and patients are protected, and their interests served.

The specific focus within the strategy is on genetics, pharmaceuticals, technology transfer, strategic innovation and information and communication technologies, and this focus is reinforced by the current Economic and Social and Research Council (ESRC) program on Innovative Health Technologies

[www.esrc.ac.uk/esrccontent/ourresearch/health\\_technologies.asp](http://www.esrc.ac.uk/esrccontent/ourresearch/health_technologies.asp), accessed 31st March 2004) where the central objective is to advance understanding of the current and future implications of innovative health technologies, together with the mediating effects of the wider processes of social change. This program has, therefore, developed a range of research projects also incorporating pharmaceuticals, genetics, technology and IT.

## **International contexts**

Deficits in the innovation of healthcare organization in the USA have been highlighted in a report from the Institute of Medicine (Institute of Medicine (IOM), 2002) which found that healthcare organizations have not innovated at the rate of medicine. However, US health organizations are not alone in this, as deficits also exist in respect of even the most innovative areas of health technology, for example the pharmaceutical industry (Wechsler, 2004), according to a recent report from the National Institute of Healthcare Management Foundation. This has meant that far from expenditure being focused on developing new drugs, the majority of resources are directed to modifying existing products rather than developing new ones. In pharmaceuticals this may be because of the pressures of taking new products to market. The impact on health systems across the world, however, cannot be underestimated in this lack of development of new drugs. Furthermore, innovation in the organization of pharmaceutical care is not ever seen as part of the equation, although this may influence the single biggest cost of pharmaceuticals to society; that is, the failure by patients to take the drugs, estimated as 50 per cent of all those prescribed according to WHO (Sabate, 2003). This example demonstrates that what is seen as important depends on whose perspective is adopted. Investing in drug innovation is important, but the industry must ensure effectiveness through patient compliance, rather than just efficiency as a revenue earner through sales, if it wishes to be more socially responsible.

## **Innovating epistemologies**

Innovation in Anglo-American healthcare is, as this pharmaceutical example demonstrates, focused largely on what might be termed the things that are known, be they people or processes. The issue of concern in both UK and US contexts is perhaps further entrenched by implied assumptions about ways of assessing innovations which are based on what the UK Innovation strategy describes as 'sound science and research' rather than questioning the efficacy of the existing ways of looking at innovations. Innovation in the epistemologies themselves may now not only be required, but may be becoming essential, if such distortions as demonstrated in our pharmaceutical example are not to increase.

The cultural dominance of such epistemologies in what Cartwright and Cooper (Cartright, Cooper and Earley, 2001) describe as the Anglo-US model can be seen as somewhat narrow. This may well have its roots in what Flynn and Chatman (Cartright, Cooper and Earley, 2001) describe in their chapter heading as ‘Strong Cultures and Innovation - oxymoron or opportunity’ because health care is littered with strong cultures be they professional or organizational and their existing epistemologies can be inimical to innovation.

The problems centre around not just the types of methods which have dominated but the hierarchy of methods led by scientific rationality (Baker and Kirk, 1998) with a gold standard headed by the randomized control trial. Even within medicine itself this hierarchy is increasingly questioned as the reality of the complex world in which healthcare operates is better understood (Sweeney and Kernick, 2002), where as Sweeney and Kernick suggest it may often be better to be vaguely right than precisely wrong. The construction of this world however is deeply embedded as Foucault demonstrated (Foucault, 2003) in his 1970s seminal text ‘The Birth of the Clinic’ where he suggests that a critical perspective towards specific historical events will uncover new layers of significance. By analyzing the methods of observation that underpinned the origins of modern medical techniques, he challenges assumptions not only about history, but also about the nature of language and reason, even of truth. However, attempts to say that such methods are no longer appropriate are unlikely to succeed unless their role and relevance to date can be shown as appropriate to at least some aspects of healthcare. What appears as a series of conflicting approaches vying for dominance may in reality be a failure to appreciate alternative perspectives that could incorporate these issues in ways which would enable the appropriate ones to be operationalized but only within the right context. In this way, the notion of a hierarchy is replaced by a nuanced appreciation of difference which is both more acceptable and appropriate.

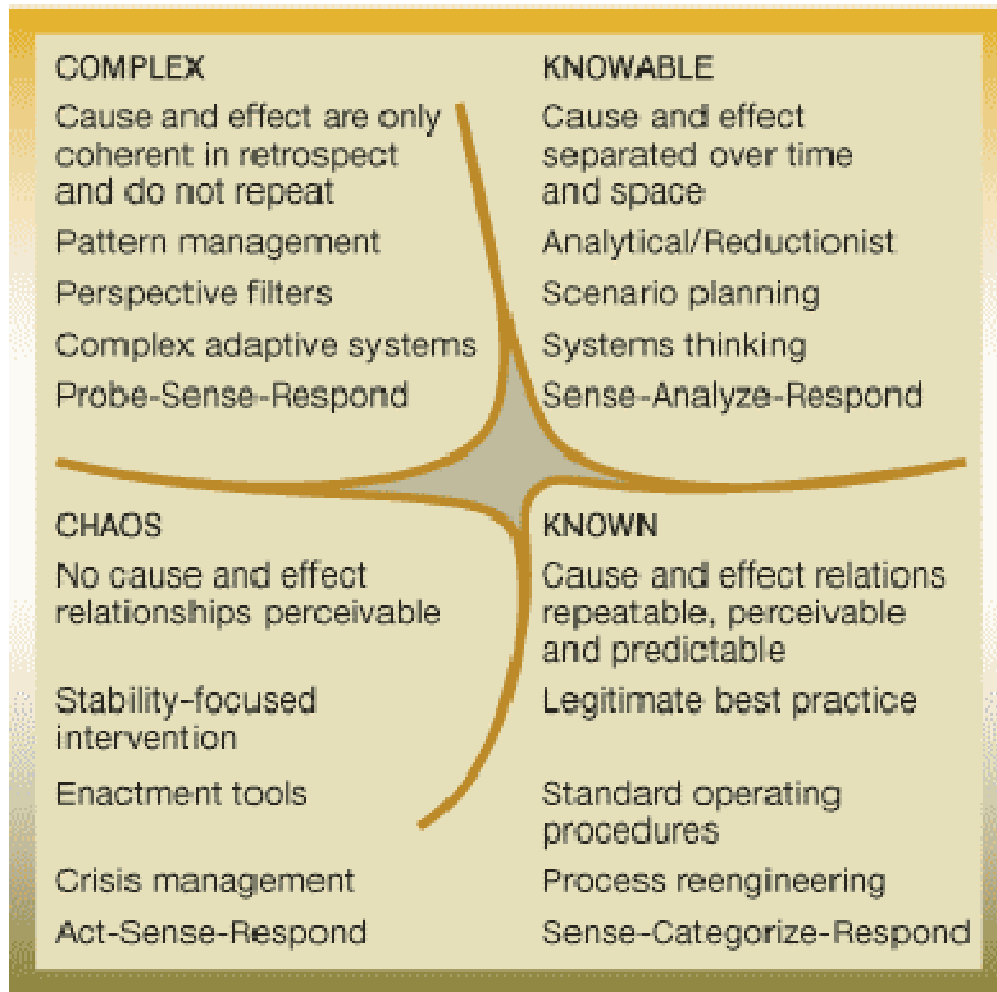
A wider perspective on these issues of innovation (Snowden, 2003), which has looked at differences across countries and industries has been undertaken within the Cynefin Centre [www.cynefin.net](http://www.cynefin.net). At its heart is a set of ideas which been developed to improve understanding of both what is done and how it is done. It rests upon a conceptualization which was first published in the academic literature in 2002 (Snowden, 2002). Associated with it are a further series of ideas that can help in both contextualizing past and current activities as well as providing new strategies for research.

## **Cynefin**

The word Cynefin (pronounced kun-ev’in) itself is a Welsh word with no direct equivalent in English. As a noun it is translated as habitat, as an adjective acquainted or familiar, but dictionary definitions fail to do it justice. A more poetic definition comes from the introduction to a collection of paintings by Kyffin Williams, ‘It describes that relationship: the place of your birth and of your upbringing, the environment in which you live and to which you are naturally acclimatised.’ (Sinclair, 2004). It differs from Nonaka’s concept of Ba (Nonaka and Konno, 1998), as a shared physical, virtual or mental space for emerging relationships that provides a platform for advancing individual and/or collective knowledge, in that it links a community into its shared history – or histories – in a way that paradoxically both limits the perception of that community, while enabling an instinctive

and intuitive ability to adapt to conditions of profound uncertainty. A simplistic two-dimensional representation of these domains is Known, Knowable, Complex, Chaotic. Disorder is the central point between the domains shown in grey in Figure 1.

**Figure 1** Cynefin domains



**Ordered: known**

Here cause and effect relationships are generally linear, empirical in nature and not open to dispute. This domain repeatability allows for predictive models to be created and the objectivity is such that any reasonable person would accept the constraints of best practice that can be found here. This is the domain of process re-engineering, in which knowledge is captured and embedded in structured processes to ensure constancy. The focus is on efficiency. Single point forecasting, field manuals and operational procedures are legitimate and effective practices in this domain.

The decision model here is to sense incoming data, categorize that data and then respond in accordance with predetermined practice. Structured techniques are not only desirable but also mandatory. In research this is the domain of known cause and effect often demonstrated through quantitative techniques such as randomized control trials and statistical models which attempt to quantify human behaviour sometimes erroneously (Mark, 2003). More recently in health care we have seen the use of regression analysis to link good practice in human resource management to patient death rates (West et al., 2002). While this use of regression, for which the authors of that study make no specific causal relation claims, may also appear appropriate to the known domain, it may, however, be more appropriate to the knowable. This is because as Amrit suggests (Amrit, 2002) it is a post hoc attempt to identify a restricted closed system, because the gist of successful regression analysis is not being able to offer a law-like statement, but to bring forth evidence of an otherwise hidden mechanism.

### **Ordered: knowable**

While stable cause and effect relationships exist in this domain, they may not be fully known, or may be known only by a limited group. In general, relationships are separated over time and space in chains that are difficult to fully understand. Everything in this domain is capable of movement to the known domain. The only issue is whether we can afford the time and resource to move from knowable to known. In general, we cannot and instead rely on expert opinion as in the doctor patient relationship, which in turn creates a key dependency on trust between expert advisor and decision maker. This is also the domain of systems thinking, the learning organization, all of which are too often confused with complexity theory. In the knowable domain, experiment, expert opinion, fact-finding and scenario planning are appropriate. This is the domain of methods which seek to identify cause-effect relationships through the study of properties that appear to be associated with qualities. For systems in which the patterns are relatively stable, this is both legitimate and desirable.

The decision model here is to sense incoming data, analyze that data and then respond in accordance with expert advice or interpretation of that analysis. Structured techniques are desirable, but assumptions must be open to examination and challenge. This is the domain in which what are termed 'entrained' patterns are at their most dangerous as a simple error in an assumption can lead to a false conclusion that is difficult to isolate and may not be seen. In healthcare such errors are often only demonstrated through the accumulation of error on a large scale as took place in the UK in Bristol, where a high volume of inappropriate childhood deaths took place before questions were asked of the experts involved (Kennedy, 2001). More recently, problems arose over the expert diagnosis in the UK of a psychiatric condition known as Munchausen's syndrome by proxy in which parents use their children's problems (often seen as parentally induced) to draw attention to themselves. The problem was compounded by the systematic and exclusive use by the UK courts of the expert opinion (Meadow, 1977) that originally identified this syndrome. The subsequent impact on hundreds of families, after a series of errors, was drawn to the attention of the public through court proceedings, providing evidence to show that the diagnosis was flawed. As a syndrome it has, however, already been a cause for reflection in other parts of the world (Jureidini, Shafer and Donald, 2003) where it is acknowledged that

the social pressure on the medical profession may distort such expert opinions and even the concepts which underpin the syndrome itself.

The known and knowable domains are not based on individuals; one does not move from the known to the knowable domain on learning something. Rather, it means that something is known to society or the organization, whichever collective identity is of interest at the time, and this collectivity of itself maintains the power and credibility of such shared perceptions.

### ***Un-ordered: complex***

This is the domain of complexity theory, a science that arose in chemistry and biology and which is gaining increasing attention in economics and management. Complex systems comprise many constantly interacting agents. Bird flocking behaviour can be simulated on a computer through three simple rules; termites produce elegant nests through the operation of simple rules triggered by chemical traces; snowflakes are unique because of patterns arising from the interactions of water particles during freezing. The patterns are not controlled by a directing intelligence; they are self-organizing systems. There are cause and effect relationships between the agents, but both the number of agents and the number of relationships defy categorization or analytic techniques. There are, however, patterns.

The patterns that emerge through the interactions of many agents can be perceived but not predicted. Within Cynefin this phenomenon is called retrospective coherence and is similar to the notion of post hoc rationality (Weik, 1995) in organizations. In this space, structured methods that seize upon such retrospectively coherent patterns and codify them into procedures will only confront new and different patterns for which they are ill-prepared when future patterns emerge. Once a pattern has stabilized, its path appears logical, but it is only one of many that could have stabilized, each of which would have also appeared logical in retrospect. Therefore, relying on expert opinions based on historically stable patterns of meaning will insufficiently prepare us to recognize and act upon unexpected patterns that emerge. The philosopher Kierkegaard in 1844 identified this in relation to life in general when he said, 'life must be understood backwards. But then one forgets the other principle: that it must be lived forwards' (Journals, IV A 164). (Kierkegaard, 1844).

The decision model in this space is to create probes to make the patterns or potential patterns more visible before taking any action. It is necessary to sense those patterns and respond by stabilizing those patterns that are found to be desirable, and also destabilizing those that are not desirable, and seeding the space so that patterns required are more likely to emerge. Understanding this space requires multiple perspectives on the nature of the system. An example of this within the pharmaceutical services in the UK emerged through the development of the innovative new role of primary care pharmacists (Silcock, Raynor and Petty, 2004). Primary care pharmacists carry out clinical and administrative work directly for family doctors and primary care organizations and their role is still developing. The economic liberalization of the NHS in the 1990s seems to have provided a major stimulus for the growth of primary care pharmacy and effectively acted to seed the space. This is because the establishment of the new professional group was not linked to a deliberate plan or change in health policy with respect to pharmacist development. The pattern, which emerged to enable their development, was perceived but not predicted and emerged as a self-organizing system. Primary care pharmacy practice is much more varied

and flexible than traditional pharmacy practice in the community and hospitals. The standards and professional organization for primary care pharmacy are slowly emerging and the modernization of the NHS is providing many new opportunities, which primary care pharmacists are well placed to take advantage of, but the precise nature of future services and providers remains uncertain, allowing future patterns to emerge through self-organization. As a group, their emergence fits with Utterback's description of innovators as outsiders with nothing to lose (Utterback, 1994), who are set against existing players (hospital and retail pharmacists), who are concerned to maintain the status quo and their roles and reputations. In so doing they fail to take advantage of opportunities while the innovators (primary care pharmacists) persevere in spite of opposition. This description fits within the complex Cynefin domain because, at this point of emergence, the UK healthcare policy domain has understood that it is the time to stand still (but pay attention) and gain new perspective on the situation rather than relying on the 'entrained' patterns of past experience to determine response.

The methods, tools and techniques of the known and knowable domains do not work here. Narrative techniques are particularly powerful in this space and Cynefin has developed a range of interventions designed to stimulate emergence in complex knowledge interactions (Snowden, 2004). These have already been used, coincidentally, elsewhere in the marketing strategies for the pharmaceutical industry to gain a better understanding of reasons for variable adoption of products by culture and also internally within the companies to replace employee satisfaction surveys with the more sophisticated representation of cultural differences provided by these narrative techniques. Within healthcare there is an emerging interest in the role of narrative both in the UK and the USA as a way of understanding, for example, the chaos presented to both patients and staff by critical illness and death (Crossley, 2003; Del Vecchio, Good et al., 2004). However, this acknowledgement of the role played by narrative in such research has yet to gain acceptance as having a place in scientific research as a way of accessing the complex space.

### ***Un-ordered: chaos***

In the first three domains, there are readily visible relationships between cause and effect. In the chaotic domain there are no such perceivable relations. The system is turbulent and the response time to investigate change is not available. Applying best practice inappropriately is probably what precipitated chaos in the first place; there is nothing to analyze; and waiting for patterns to emerge is a waste of time.

The decision model in this space is therefore to act, quickly and decisively, to reduce the turbulence, and then to sense immediately the reaction to that intervention so that we can respond accordingly. The trajectory of our intervention will differ according to the nature of the space. We may use an authoritarian intervention to control the space and make it knowable or known. This would be appropriate in symmetric threat where the parameters of acceptable behaviour are known and intention can be determined. However, in asymmetric threat we need to focus on multiple interventions to create patterns and thereby move the situation into the complex space where new patterns can emerge. In health care treatments this is the domain of the accident and emergency specialist responding to multiple failures in individuals, but also major accidents themselves where the extent and effects are largely unknowable until they present requiring immediate action. Scenario

planning is often used from the knowable domain as a predictive tool for future action. Key heuristics around the principal rules which guide such actions, often from the professional rather than the organizational domain, will come into play when the situation itself presents, enabling a shared response to context.

### ***The domain of disorder***

The central area of disorder outlined is key to understanding some of the conflicts that exist amongst decision makers in reaching agreement on the nature of a situation. As a result of this, individuals compete to interpret the central space on the basis of their preference for action. Those most comfortable with stable order will seek to create or enforce rules through control. In healthcare this is most often managers and or politicians. From the knowable, experts will seek investment to conduct research to determine the 'right' answer. In healthcare this may be clinical professionals or managers. In the complex, politicians will increase the number and range of their contacts to increase communication and stimulate the emergence of a new solution, as they intuitively understand the problems presented by the complex space. Finally, in the chaotic, the dictators, who can be from any area of expertise but who seek power often without the responsibility that follows, will determine that a crisis has occurred pushing the situation into chaos from which action and not thought is required, allowing their absolute control of the situation.

The reduction in size of the domain of disorder is a consensual act of collaboration and a significant move to the achievement of consensus as to the nature of the situation, removing the conflict otherwise implied. It depends on an understanding and acknowledgement of the differing perspectives and their appropriate utilization to the situation in question, as demonstrated in any emergency situation where clinical teams are required to work together; most recently, for example, in the response to the suicide bombers on the London Transport system in July 2005.

In healthcare, the domain of disorder is perhaps where much of the existing disagreement exists not least because of the failure to engage with the differential research methods that might be appropriate to each domain. While there is an appreciation of the role of complexity theory in the development of organizational systems like clinical governance (Sweeney and Mannion, 2002), it is not understood as a key issue for research methods themselves. This often results in a resort to more simplistic reductive interpretations, or unique qualitative descriptors of situations which are often not transferable. New concepts require development to overcome such deficits.

The assumption that healthcare knows about innovation is a fallacy disproved by the many innovations which have not succeeded or have succeeded only in part or in certain contexts. For example, the implementation of evidence based medicine (EBM) is a case in point (Fitzgerald et al., 1999). This attempt to apply a systematic approach to the evidence for healthcare interventions, on the assumption that this is sufficient to ensure that it will be adopted by those giving treatment, was confounded by the failure to predict the low adoption by those in the front line. This was in part because the innovations themselves (Fitzgerald et al., 2002) were often ambiguous because of the contested nature of new scientific knowledge, the highly interactive nature of diffusion and no evidence that adoption can be located within any one single decision or moment in time. Science is socially mediated and context and actors interlock to influence diffusion.

## **Conclusions**

Innovation contests both order and certainty. Any attempts to constrain it to the known or know able will damage both the emergence of new pattern and innovations.

Healthcare is distinguished by a search for certainties in an uncertain world - what is wrong and how can we change this? It is a search for causality that will lead to the potential to identify successful intervention. When this is not achieved the purpose is often lost and alternative approaches or indeed alternative problems are sought. It is not, therefore, surprising that this perspective underpins assumption not only about the business of healthcare but also its organization. When we add to this the vested interests of international organizations like pharmaceutical industries, professions like medicine, governments and their agents like the NHS, it is not surprising that innovation may be misinterpreted and misconstrued. What is required is a way of making such contested domains not competitive but complementary, enabling the appropriate identification of the issues and the appropriate but different responses to be employed. Cynefin is one way of enabling this to happen that does not deny the role and validity of existing perspectives but shows both the relationships and potential interactions between these differing domains. As such, it is at the very least one way forward in understanding the nature and context of healthcare and how different epistemologies need to be applied as we both research practice and improve the practice of research.

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