

A Local Sociotechnical Design Approach to Exploiting the Potential of The National Health Service IT Programme NPfIT

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Background

NPfIT is the National Programme for Information Technology of the National Health Service. It is a 10 year programme costing (depending on the source of information) between £6.2 billion and £31 billion. It is intended to deliver to all the health care trusts in England, including all hospitals, GP clinics, ambulance trusts etc, a suite of computer applications that will create electronic health records for everyone and enable their exchange between all health care services. It has been called (Brennan 2005) 'the biggest computer programme in the world.....ever'. It is being co-ordinated by a Department of Health agency called Connecting for Health which has negotiated contracts with eight consortia (consisting of big consultancies, project management companies, IT suppliers and change management specialists). Some of the consortia are to deliver specific national software solutions such as the National Spine, a limited health care record for each of the 50 million people in the country, and 'Choose and Book', a system for use in GP clinics that enables patients to choose between up to five clinics and hospitals when they need specialist treatment. Five of the consortia are delivering electronic health care systems to large 'clusters' of health care trusts in regions of the country, e.g. the North East cluster, the southern cluster etc. They will deliver a common electronic health care record system to all health care services in the cluster and thus facilitate the exchange of comprehensive healthcare information in each region.

This centralised programme has been created in a climate of governmental frustration with the piecemeal progress of information technology in the health service. Historically, for example, each hospital has created or purchased its own IT systems and been unable to share data with others. The standard solutions in the programme are intended to cut through this problem, to ensure data interchange, bring everybody up to a common standard and modernise the way

healthcare services are delivered. Although the programme delivers a set of software applications, the intent is to promote electronic working practices by all healthcare staff.

This programme presents a major methodological challenge to sociotechnical systems practitioners. We have long advocated the co-development of the technical and social systems in any organisational setting. Here the technical development is predetermined and the social system in each health care organisation is expected to accommodate it and deliver 'modern' healthcare. We might predict that under these circumstances there will be considerable strife when the new technical system encounters the in-situ sociotechnical systems that currently deliver healthcare. But are interventions possible that might lead to the creation of effective sociotechnical systems incorporating the resources of the new technical systems? This paper is an extended version of an article that appeared in the British Journal of Healthcare Computing and Information Management (Eason 2005). It advocates that healthcare trusts adopt a form of local sociotechnical design to seek out positive ways of exploiting the technical resources of the national programme.

The 'Push' Strategy and the Organisational Response

The implementation of the NPfIT systems is generating much heated debate in the NHS and causing considerable anxiety. Mark Outhwaite (News 2005) has described NPfIT as a juggernaut coming over the hill, a metaphor that captures very well the sense of inevitability and of helplessness on the part of the people standing in its path. Many people feel that they have not been adequately consulted about the design of these national systems and it seems that it is now too late for them to influence the form these systems will take. What then is an appropriate response in the full glare of the headlights?

Although NPfIT is different in scale from previous systems, it is of course not the first time that major systems have been developed by the few and delivered to the many in the expectation that they will adapt their practices to the requirements of a centralised system. There is a rich literature of accounts of implementations of this kind in industrial, commercial and public service applications, as well as those in health care. What can we learn from the way these systems have been implemented and from their outcomes for user organisations? The purpose of this paper is first to review what has happened in similar circumstances and second to outline a strategy that user organisations have found useful in these situations.

Implementation Practices The way in which large systems are implemented is usually technology oriented; the technical system is installed and people are trained to use it. A 'management of change' approach may be added to facilitate the adoption of the new system and avoid resistance to change. In general this is done by encouraging local management to show commitment to

the required changes and to lead their staff in the direction of new work processes. Another common feature of the implementation of major new technology systems is that they are often used in association with, or as the driver for, organisational changes; perhaps to 'improve' and 'standardise' working practices and maybe to 'downsize', 'outsource' and otherwise change the composition of the workforce. It is quite clear that the leaders of the NPfIT programme do not consider it just a set of new technical systems; they are quite explicit in stating that the new systems will lead to sweeping changes in the work practices of the NHS (NPfIT 2005). As Fairey (2005) states, this amounts to a 'push' approach to change that leaves little room for the consideration of local needs and interests. Inasmuch as there is a general strategy for the delivery of NPfIT systems, it can be characterised as 'push' the technology and 'manage' possible resistance to changes in work practice.

Common Organisational Responses: Failure, partial use and 'workarounds'. Many studies have shown how people in organisations respond under 'push' conditions and the evidence from these studies can be used to predict what might happen if NPfIT systems are delivered by this strategy. One well-known response is the failure of the system. There are well publicised examples in publicly funded projects, for example, the collapse of the London Ambulance Despatch System (Page et al 1993). There are similar sagas in industry and commerce but they are often not subject to the full glare of public scrutiny. The Standish Group (2001) have kept records of the success rates of IT projects in the USA since 1994 and for 2001 they report 28% successful, 23% failures and 49% 'challenged', i.e. showing major problems in meeting objectives. One worrying conclusion they reach is that there is a correlation between the size of a project and the outcome: the bigger the project the greater the likelihood of failure. And the NPfIT programme is the biggest in Europe. However, it is composed of a number of systems that are to be implemented in many different places and it is not likely to result in one major failure.

It is much more likely that we will see a set of outcomes that have been documented time and again: that users will find their own ways of adapting to the new system when it is implemented. These are often described as the 'unintended consequences' of system implementation (Eason 1996). There are two major forms of adaptation and they will be familiar to everyone in the front line who is using a system that was designed somewhere else. The first strategy is partial use; to use some of the services and facilities of a system (those that are useful to the individual) and to disregard the rest. This approach is particularly favoured by professionals, managers and others with sufficient discretion to adopt a selective approach to using a particular system. The Health Commission audit of the use made by doctors of the electronic services available to them (Smith, Bailey and Boyce 2004) demonstrated that usage of the available services ranged from 100% for some services to 10% for others. This pattern has been found many times. In a study for a major bank (Eason 1984) we examined a system that gave branch staff 36 ways of accessing details of customer

accounts. Each option was designed to support good working practice when engaging with a specific task for customers. In practice we found that the majority of branch staff knew and used no more than five of these options.

The other approach that is very common amongst workers who have little choice but to use the system that is implemented is to develop 'workarounds', i.e. to find unofficial ways of using the system so that it would meet the demands of the work they were undertaking. Sometimes these are imaginative and effective and constitute excellent additions to working practice (however, instead of welcoming such ways of coping, managements often forbid them); in other circumstances they are just laborious and frustrating ways of coping with an inflexible system that does not do what the job demands. Nocera (2005) offers many examples of this practice in his study of how workers in companies around the world responded to an ERP (Enterprise Resource Planning) system. ERP systems are sold to companies as a means of achieving 'best practice' in dealing with common business functions such as managing sales, purchasing and stock control. Nocera collected evidence of the problems that using a particular ERP system caused around the world. In one country, for example, it was common practice to extend the early order discount beyond the due date and every trader was expected to do it. Unfortunately the ERP system enforced the due date and the staff had to engage in various workarounds to give disgruntled customers the discount they expected.

It might be argued that these tactics are examples of resistance to change; that they show people clinging to old ways of working. No doubt there are elements of truth in this. However, an alternative explanation is that people are working in very varied contexts and have to cope with specific, local circumstances and their working practices have to vary accordingly. As a result no highly standardised system can meet the demands of reality and local people have to find ways of coping with the gaps. The Health Service contains such a diversity of demand that this explanation has great power. The one prediction that can be made with great confidence is that, when NPfIT is fully implemented, there will remain an enormous variety of working practices only a few of which will resemble those envisioned by the architects of the programme.

Developing a 'Pull' Strategy

IT systems do very little on their own and, in the final analysis, the effectiveness of the NPfIT systems will be determined by the use made of them by NHS staff. And the evidence is strong that people will find ways of using or of not using a system according to their perception of its usefulness with respect to the healthcare realities they meet on a day-to-day basis. There are enormous variations in these day-to-day realities and these affect the electronic resources that are needed. As Milan (2005), in his case study of the Royal Marsden Hospital shows, when a hospital has a major research function the demands it makes on electronic patient records are different from a hospital where research

is not an issue. We found in a study of EPR pilot sites, that there were major variations in requirement between specialties associated with different clinical conditions (Klein 2001). In an orthopaedic ward the records could focus on the specific medical details associated with operation and recovery processes. By contrast, in a ward for the elderly, care and treatment required inputs from many disciplines and colour coded electronic records were valuable in showing the contribution of each specialty and ensuring effective collaboration. Taking the focus on clinical conditions further, it becomes obvious that the patient records needed in an acute hospital will be very different from those needed in a mental hospital.

In practice the use of a NPfIT system will depend on its match with local requirements. If the 'push approach' is limited to training the users in the operational detail of each IT system, it will be left to each specialty and each unit to find its own way of 're-constructing' the system to suit their needs. The users will decide what to use and what not to use and how to 'workaround' the obstacles or inadequacies. This will become a piecemeal approach, largely hidden and informal, and may well involve a lot of delay and stress. It is likely to be dysfunctional from the point of view of the staff and management of each Trust and also for those who have invested in the development of the systems. Is there a better way of implementing these systems?

We can look for answers to the examples of successful IT systems implemented in the NHS. As Fairey (2005) points out there are many examples and he cites some of the winners of the 2005 Healthcare IT Effectiveness Awards (for example, Marsden, Taylor and Coker 2005, and Beattie 2005). What characterises these systems is that they are local developments, the product of close co-operation between IT specialists and relevant clinical and other user groups, that had a focus on meeting a real need of the user groups and on designing a system that fitted their working practices. The factors that lead to success are well known and add up to what he describes as a 'pull' approach; find out what the users want, get them involved and let them 'pull' the system through to implementation. In our experience of this approach the question of resistance does not arise; the problem is usually how to meet the user's expectations of what can be delivered and when.

But how can these characteristics of success be used to advantage in relation to the implementation of NPfIT systems? Is a marriage possible between the 'push' and the 'pull'? In our experience there are many opportunities to blend the two provided the implementation of an externally developed system is considered as a contribution to the evolution of the local 'sociotechnical system' (Klein 1994). Each healthcare unit, viewed as a sociotechnical system, is already a system in which people occupy work roles and use the available technical resources in the work practices that yield healthcare outcomes. The incoming system can be regarded as an offering (albeit an offering that cannot be refused in this case) that is to be evaluated for its potential to contribute to this existing sociotechnical

system. The question is how best to exploit the new potential and to manage the implications for working practice of the arrival of the new system. The problem is not how to train people to use the new system; it is how to redesign the local work system in the light of the new resources that are available. It is difficult to know what flexibility NPfIT systems will offer but there are three areas of design to examine:

1. What functions does the new NPfIT system offer and what flexibility exists in the way these functions can be offered?
2. The new system will have to operate with a range of legacy systems. Apart from the technical challenges this represents, how can this combined resource best be structured to meet the needs of the users who are delivering healthcare?
3. What opportunities are there for the re-design of the local social system and local working practices? The arrival of the new technical resource may make it possible for local staff to change local organisation, work processes and work practices to improve healthcare.

There is very little experience as yet of the implementation of the new NPfIT systems and it may be that there will be limited opportunity to tailor them to meet local needs but there will be local opportunities in relation to the other questions. Collins, Braim and Heathfield (2005), for example, describe the local work done on work flows and work practices to implement the 'Choose and Book' system. It is likely that similar design work will be necessary in other settings and that many different ways will be found of adopting 'Choose and Book'.

A User-Centred, Local Design Approach to Implementing Systems

This approach to blending 'push' and 'pull' is a structured way of helping local stakeholders take control of the process, decide what value there is in the new offerings and design a way of getting the benefits and managing the problems. It is an approach we have used in a number of settings where externally developed systems are being used by local groups. Currently, for example, we are working with the developers and users of zetoc (Eason 2005), an electronic bibliographic system that delivers information about the holdings of the British Library to UK Universities and to the NHS. This is a system that many local user groups are integrating with other information resources and we are helping them through this process and reporting on their progress to the zetoc developers. This in turn is leading to changes in the system itself. This results in local sociotechnical systems design and the evolutionary development of the centralised technical service. The approach is founded on the following six principles.

Principle 1: Study the primary work process as a sociotechnical system.

The focus of the work should not be the new technical system; this is just a service to where the real work is done. The focus should be on the sociotechnical

system that does the healthcare work; i.e. the patient pathways in which healthcare is provided by NHS staff and the services that support them. The development of effective new inputs to this system depends on understanding how this is done in each context, not on generalised prescriptions of how it should be done.

Principle 2: Understand the ambitions of local stakeholders. People delivering healthcare have ambitions to improve their practice, are conscious of management goals and know the problems that need to be overcome etc. The stakeholders will 'pull' for the adoption of a new system to the extent that they perceive that it will help with the achievement of these local aspirations. National goals are abstractions; it is local benefits that matter locally.

Principle 3: Create local planning teams of all the relevant stakeholders

Everybody agrees that commitment comes from involvement. It may be too late for active involvement in the central design of NPfIT systems but, as Jones (2005) points out, everybody can be involved in the design of their own practice. IT professionals, clinicians, nursing staff and administrators etc. can therefore form teams to consider how the new systems will be used in their territory.

Principle 4: Review the implications of externally developed systems for the current sociotechnical system.

When an NPfIT system is ready for delivery there is a need for each healthcare team to assess its implications. There is a need to create scenarios of how the system might be used in the context of the existing sociotechnical system; what the work flows will be, who will be doing what with respect to the system etc. If a realistic scenario can be developed, stakeholders can 'walk through' it and identify how benefits can be realised and what problems will have to be overcome. This usually leads to a recognition that there are a number of ways the new system could be implemented and to the establishment of the best way to realise the benefits in the local context.

Principle 5: Design a new sociotechnical system for delivering healthcare that exploits the capability of the new technical resources to meet the ambitions for improvement of local stakeholders.

The realisation of the new sociotechnical system is both a piece of technical design - tailoring the new system and relating it to existing systems - and a piece of social system design. The latter may involve new job allocations, new working processes, training etc. There are likely to be 'design' roles here for both IT staff and for the management and staff of the using community.

Principle 6: Adopt an action research approach. If new systems can be implemented in phases, using pilots where possible, it becomes possible to gather systematic evidence, both quantitative and qualitative, of what people are doing with the new capability and why. It is possible to identify newly emergent work practices and ask why they are appearing. This information can be

reviewed by the local design team and used to adjust the local system as necessary and guide its broader dissemination. The information may also be fed back to central development teams to provide them with an evidence base on the usage of their systems that may, in turn, guide the development of subsequent releases of the system.

Conclusions

A striking feature of the NPfIT programme is that many people in the NHS seem to agree with its overall goals. What they have trouble with is the way it is being implemented. There is a lot of work to be done in every Trust to implement the new systems. If we can mobilize the reservoir of expertise in healthcare matters that is available in every location it may be possible to find ways of 'pulling' these systems in the direction of significant local goals. If not, unintended consequences will be rife as we try to cope with systems that do not serve local needs. Under these circumstances neither national nor local goals will be met.

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