

NHS on the line

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Problems and Issues in IS development

Information technology provides the links for global communication and information support systems. However, in recent times there have been a great number of cases of computer system failures causing many problems for those trying to use them. The failures have affected both private and public institutions. For example, the failure of the London Ambulance computer system created problems for staff, managers and patients (Wastell and Newman, 1996). There are others, the child support agency cancelled after a spend of £600m (Jones, 1997), the London Stock Exchange system, Taurus (Drummond, 1986), Wessex Health Authority (Kirby-Green, 1993), the HISS initiative (Jones, 1997), the pathway initiative cancelled after £878m (Ranger, 2000). Of course computer failures of this kind can be found in most countries throughout the world, e.g. SNCF (French rail) booking system Socrates reservation system (Mitev, 1996), national Australia bank (Johnson, 1996), state agencies in Texas (James, 1997). The cause of failure in each case will be varied but it is rarely caused by the technology itself. See Table 1. Below.

Project	Author
TAURUS	DRUMMOND (1986)
WESSEX HEALTH AUTHORITY	KIRBY-GREEN (1993)
LONDON AMBULANCE	WASTELL AND NEWLAN (1996)
PATHWAY	RANGER (2000)
SOCRATES	MITEV (1996)
NATIONAL AUSTRALIA BANK	JOHNSON (1996)

Table 1: Examples of computer system projects considered failures.

Information System Failure?

Public service

Following the cancellation of an £80m it system, the chairman of the public accounts committee was reported as saying that: “one of the major problems was the ‘horrible interface’ between civil servants, who understand all there is to know about, for example, the national insurance system but know little of how a computer works, and technicians who just know the reverse”, he went on ... “they don’t spend enough time at the start of the project explaining where they are both coming from” (Morris and Travis, 2001).



Horrible Interface? (Morris and Travis, 2000)

Dangers of IT and human decision making

*The design methods used by software engineers and computer scientists owe their origins to the hard scientific disciplines from where these areas of expertise emerged. The reductionist believes that there is an objective reality and a clear logical pathway to every situation. It systems are designed on this premise. The decision maker who wishes to use technology as part of their decision making process will be considered, if considered at all, to be an extension of that logic. Organisations are characterised by change and the human managers prime task is to find ways in which their policies and actions enable that organisation to maintain its relationship with its environment (Vickers, 1983). **The decision maker wants to have full participation to develop an information system with flexibility and one that will respond to their need. This argument appears to be in contrast to some arguments in the professional journals which advocate “new business processes must also fit unmodified software and not***

the other way around” (Economist, 2002). Traditionally the public sector want IT systems made to fit existing ways of working and not one which requires them to conform to the way of the IT system.

IT failure

Whilst it is possible that computer failures relate to the difference between client expectations and the delivered technology, these failures are said to have their origins in the methods and techniques employed in the information system development process. It has been argued that the traditional approaches to IS design are ideally suited for IT systems but less than helpful for those involved in organisational problems (Avison and Wood-Harper, 1990; Checkland and Holwell, 1998; Stowell and Champion, 2000, 2002; Stowell and West, 1994.) It can be said that organisations do not exist outside the human consciousness that create them, humans are not objects but bring a conscious history to the situation. They can make choices, can plan. The search for generalisations based on perceived action/response is misguided. The introduction of an IT based IS will certainly involve challenges to agreed working structures and working practices. But organisational intervention is judged a success or failure by those who make it up rather than measures of success based on other similar organisational interventions and so there are inherent dangers for migrating IT systems from the “laboratory” or dissimilar installation into the new workplace. It is unwise to ignore the practical knowledge of those working at the coal-face. A recent article offered the conclusion that “older and most powerful executives know most problems at work are human relationship problems” (Furnham, 2002) the introduction of new IT systems requires change management skills.

Deficiencies of traditional approaches

It is true that many of the methods used in the development of information systems are performance driven and related to an era where many of the applications were easily defined and a direct translation of clerical tasks into coding. Methods used in the design of electronic control systems were imported and used to develop information systems for use in human social activities (Stowell and Champion, 2000). With the advent of the virtual enterprise, exacerbated by the globalisation of business, we have argued for the methods of design that allow us to rethink the problem rather than re-equip existing practices. For the modern enterprise the control and decision-making systems are different from those of the past. Modern ICT enables major restructuring and the redefinition of tasks and roles. Methods of IS design from the data processing era are as defunct at the monolithic enterprises in which they reside (Angel, 2000).

Lessons from the last workshop

Feedback at the last SPMC working in January suggested that the present NHS it project appeared to be in danger of “throwing” money at a problem yet to be defined. The NHS is undergoing a significant change. For example, on April 1st five health authorities in Wales will cease and be replaced by 22 health boards (Dobson, 2002), in Scotland the Scottish executive health department will combine two departments and effectively bring together work being done by one group to modernise the structures and the work of a second group who are looking at the way people work and develop, (Trueland, 2002). The NHS as a whole is committed to workforce development and at the same time train, recruit and hold on to consultants, GP’s,

nurses, midwives, health visitors and health professionals by 2008 (Davies, 2002). Whilst this change is taking place over the next five years, Richard Granger, it director of the NHS, will be spending £12 billion of public funds on various it projects with the aim of improving the service offered by the NHS. The projects targeted by these funds include developing an electronic prescription service and also online booking for hospital appoints; Granger has the task of achieving 50% coverage by 2005, (the Economist, 19th October 2002). Given the history of failure in major it projects and the pressure granger is under to show evidence of success before the next general election, what are the chances of another it failure – this time of epic proportions? Vickers words seem relevant here for organisation change in that any system to have stability .. “does not consist in prescribing one goal or even one series of goals; but in regulating a system over time in such a way as to optimise the realisation of many conflicting relations without wrecking the system in the process” (Vickers, 19??).

Wales	new structure (Dobson,2002)
Scotland	merger (Truland,2002)
UK	workforce development (Davis,2002)
UK/IT	50% coverage by 2005 (Economist,2002)

Comments from the last workshop – throwing money without defining what the problem is!

NHS and Change

Systems ideas and IT

Experience shows that whilst some aspects of IT development are satisfied the technical specification is a difficult marriage. In complex situations where there are significant changes, as is happening to the NHS, technical methods of design are inadequate. Whilst SSM has been used successfully by a number of practitioners to help design information system strategies there are acknowledged problems when this methodology is used for IT design. The difficulty is getting a coherent link between a business IT strategy and a specific technical specification. Attempts to merge soft and hard approaches have had limited success (Champion and Stowell, 2001). Lessons gained from experience there is a time in the process when the practitioner and the client-set part company. That is usually when it reaches the technical specification stage. The problem seems to be that soft approaches provide a basis for technical staff to begin to learn about the situation of interest but the opportunities for the clients to learn about the technical complexities are limited.

For this workshop we are going to focus on the NHS and offer some ideas we have found useful and how we might apply to this area on interest. Specifically we want

to concentrate upon getting people to think about what they are doing and how they do it. To do this we will look at the development of systems ideas and IT definition then move on to two tools which we feel are useful and can be learnt quickly so, if you chose you can use them tomorrow!

Understanding and ownership

Looking back over a number of years of using the traditional approaches to IS development and the soft approaches there are two important lessons. The first is the importance of enabling the clients to appreciate, to understand, the situation and its context. The second is the transfer of ownership.

Dealing with the first point: appreciation. Despite best efforts systems practitioners are still confronted by a fait accompli when entering an enterprise. Either the sponsor of the project will define the problem or solution at the outset of a decision will have already been taken with the expectation that the practitioner will arrive at the same conclusion. There are Systems tools that have been developed to facilitate this vitally important stage but applying these ideas is often not within the purview of all practitioners. These methods need to be learnt and put into practice.

The second area is that of transfer of ownership. Soft systems ideas provide a good basis for achieving transfer of ownership but can disappoint in a technology project. The advantages of using soft systems ideas provide the clients with a means of contributing in a meaningful way in addressing their concerns. The problem arises when the development phase moves into specification. Although it is not unusual for the client to become disenfranchised at some stage of any project, it is often at the conversion of their ideas into it reality that it becomes more acute. The reality of the it support brings with it a number of concerns including changes to working practices, redundant working practices and reductions in the labour force. It is to be expected then that ownership and success are synonymous. How then do computer systems fail? Sabotage is often quoted as one of the main reasons for it failure (ref-need to check). This is often because the clients have failed to take ownership of the information system and find ways of by-passing it or of highlighting its weaknesses. The computer system is seen as an intrusion rather than support (or an invader rather than liberator???).

1. understanding from within

2. transfer of ownership

But we also need to consider:

3. systems tools

4. client-centred need client-led

Four Important lessons

Client led not client centred

Over the past decade attempts have been made to address the difficulties involved in enabling the transfer of ownership of the new information system by attaching a soft approach to the hard technology related technique. For example, Multiview (Avison and Wood-Harper, 2000), SSADM (HMSO, 1993). These approaches could be liked

to miles observations about embedding and grafting soft to hard techniques (miles, 1988). There is a measure of success in the application of these approaches but the problem remains of how to engage the client through the whole design and development process. At the IT design stage the client is kept informed but is largely outside this process. It is difficult to see how a satisfactory transfer of ownership can take place. Despite the use of systems ideas we argue that these methods may be client centred but what we want are client-led approaches (Stowell and Champion, 2000; Stowell and West, 1994).

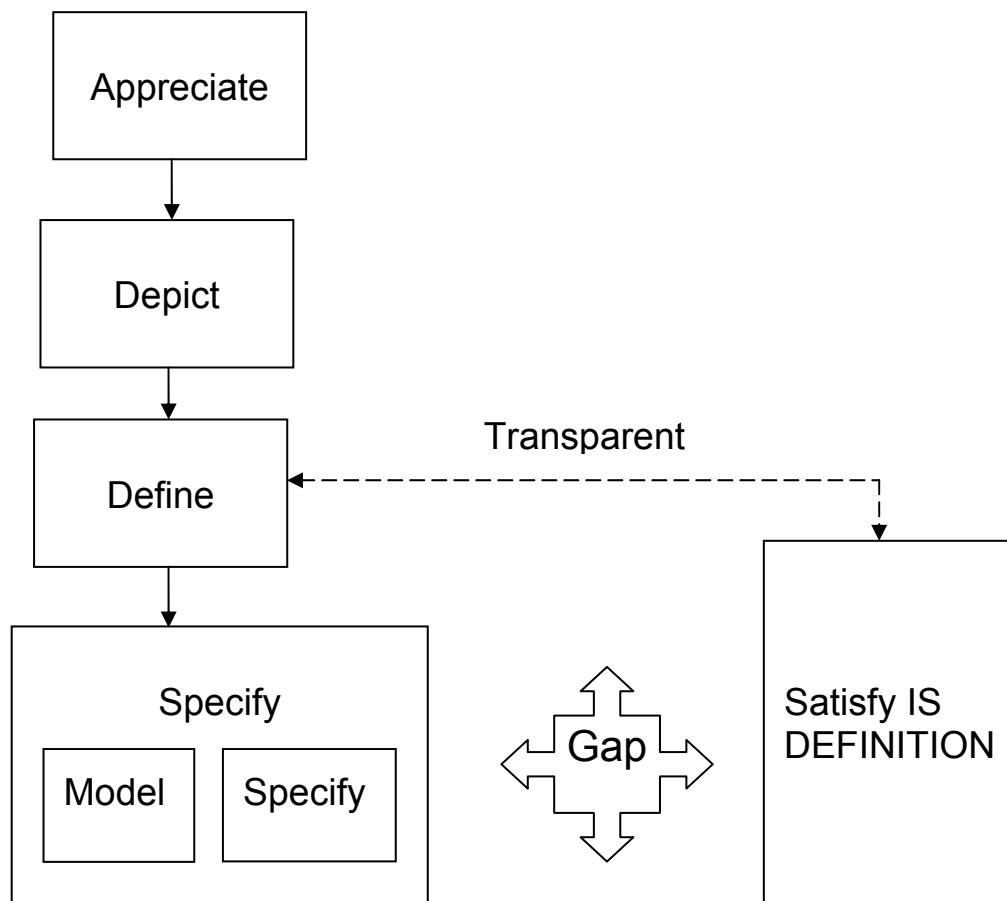
Revisiting

Revisiting systems ideas and the problems of IS failure meant critically examining the strengths and weaknesses of the ideas used within the context of their practical value. There is little doubt that the employment of systems tools which help those concerned to understand the situation are important to its development. It was also clear that a blanket use of, say, rich pictures was not always appropriate or acceptable to the situation. To this important idea we felt should be added other appropriate systems tools. It was clear that in most instances using ideas from soft systems methodology such as root definitions and activity models were valuable aids in helping the clients to clarify their thinking and could be used in most instances in its development. But these too could be supplemented or replaced with other systems ideas, such as influence and rates and levels diagrams, depending upon the situation. The important problem of ownership was however not so easily addressed. Despite the use of systems ideas, which, in the hands of an experienced practitioner, involve the client throughout the project fall over when it comes to the technical developments. There is a clear gap in the process. It is this gap that the chairman of the public accounts department referred to as the "horrible interface" (Morris and Travis, 2001), between technical staff and clients.

Client Led Design

The focal point of our endeavours for some years has been to concentrate effort in finding ways that address the dual problems of ownership and addressing the gap between natural language definition and technical specification (Stowell, 2000). Experience showed that using Soft Systems Methodology would enable an experienced practitioner to move from being the project leader to become a part of the team where ownership of the situation was shared. The lessons learnt from the applications suggested that with skill the practitioner could enable the clients to drive the whole development process with the caveat that certain areas were monitored. For example, ensuring that the study does not deviate from the use of systems ideas and assisting the group to manage the potential effects of change. The difficulties arise when the translation of the clients ideas into the technical specification. Despite much attention to the problem it has as yet not been possible to provide coherent support for the movement from ideas for purposeful action created by those involved in the situation, to thinking about support for that action. The lack of guidance for making this change in focus, in a logically sound and coherent manner becomes particularly problematic when the desired support includes a technology-based information system. One of the main reasons given for this lies in the different epistemology applied during inquiry in social situations to that employed during the construction of a specification for any supporting information technology (Doyle and Wood, 1991; Miles, 1988; Prior, 1990; Stowell and West, 1994). It was clear that

whilst it was possible to achieve a first level specification of the clients' information system requirements there was a major difficulty in translating this into a technical specification. The challenge was to find some way of traversing this gap using intellectual devices suited to guiding inquiry in social settings, to using intellectual devices suited to constructing the logical specification for an information system. It is fundamental that in order to get ownership the clients must engaged throughout the whole process. They need to be assured that the end result is a faithful translation of their requirements, or agreed changes. We have argued that the client needed to drive the whole process and to emphasise this we called the approach (not method) Client-led design. Rethinking the process of information system definition seemed to involve 4 stages. These were Appreciate, Depict, Define and Specify. Experience had shown that SSM was a powerful idea that could help with IS definition and we found that we could use it unaltered in green field to enable the clients to drive the project but we were still left with the difficulty of moving to a technical specification. By dividing the specification into two: Modelling – it would allow us to use activity models and then Specify – that is translate the models into the technical specification and hence bridge the gap. A first attempt involved the use of data flow diagrams as a means of translating the activity models that are used in SSM into something resembling a technical specification (Stowell, 1985, Stowell, and West, 1994). This approach was moderately successful but there was a danger that the transformation of the activities modelled in the activity diagram end up as a mutated version. That is to say one that relates to an undeclared model in the designers mind. Object oriented modelling appeared to offer a means of more readily translating the activity models into a technical specification (Stowell and West, 1994, Liang et al 1998, Guo, et al, 2000). But this too proved unsatisfactory in many respects because of the bias towards the fulfilment of the technology.



The Client Led Design Framework.

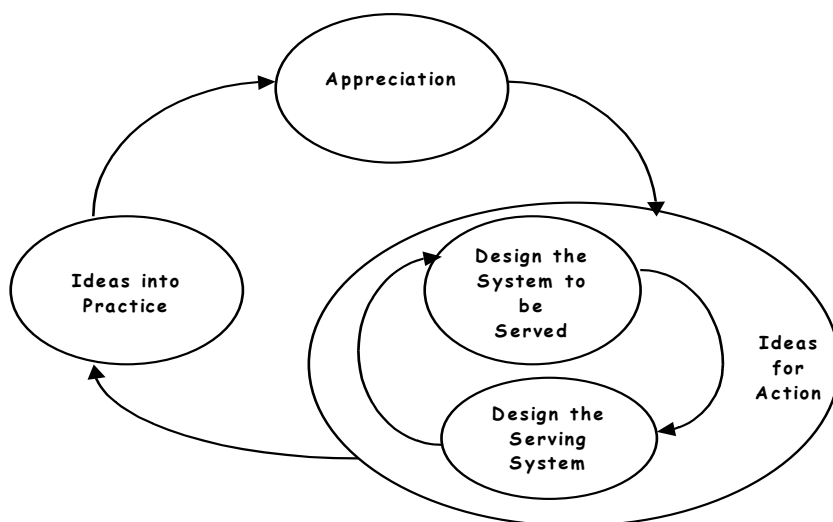
Client led Information system Creation CLIC

We decided to return to the basic ideas that we had found useful and re-evaluate them in the light of experience. We were looking for a means of fulfilling the technical requirements of a problem situation but driven from the client end rather than the technological end. We sought coherence.

Ideas for purposeful action, the system to be served (Checkland and Scholes, 1999), need to be considered in context. Indeed, some argue that if the action is to be implemented there will be additional activities related to undertaking that action in practice (Mathiassen and Nielsen, 2000; Mingers, 1995; Savage and Mingers, 1996). During a process of information system design, reaching some accommodation among a group of people for some ideas for purposeful action that may bring improvement is only the first part of the journey. Thinking about ideas for purposeful action in context and considering any opportunities for technology-based support may increase the possibilities for action by those involved. Another phase of debate to reflect upon these possibilities seems essential if a serving information system is desired. The above attempts at using activity models in a process of information system design moved too quickly to specifying the design of the technological support (Champion and Stowell, 2001). What is needed is further consideration of how the potential purposeful action might unfold in context (Champion, 2001).

When creating a logical specification for a technology-based information system, what was required was a detailed view of how the intended action might operate in practice, to facilitate the software developers creating a full specification of requirements. The idea of a navigational phase of inquiry emerged, where participants explicitly use some other intellectual devices to navigate from any ideas for purposeful action, to some ideas for support (Champion, 2001; Champion and Stowell, 2002). A form of conversation model was as being a suitable intellectual device for the navigational phase (Champion and Stowell, 2002). The models facilitated debate concerning the implications of implementing the intended action in the real world situation, enabling those responsible for creating the technical specification to consider how to provide the technical functionality required. That is, the models helped to ‘contextualise’ the ideas for action, expressing how the action might be operationalised within the real world situation. By employing a conversation model as a debating device, an activity-oriented view of the situation is maintained throughout this phase of inquiry. It was argued that this would provide a degree of continuity between the conceptual activity models employed in the initial phase of debate to express ideas for action (Champion and Stowell, 2000) and the models used to express how that action might be operationalised in practice. The evolution of the systems ideas of CLD became Client Led Information System Creation – CLIC.

Client Led information system creation (CLIC) is being developed through practice, to facilitate those involved in information system design and development in navigating from the creation of ideas for purposeful action to creating a logical specification for a serving information system. The framework can be represented by the diagram below.



CLIC: Client Led Information system Creation

One of our main concerns continues to be to facilitate the clients being actively engaged in leading the investigation. The first phase of inquiry during a process of is development should be to undertake an exploration of the problem situation and to create a shared appreciation (Vickers, 1965) of the situation from the perspective of those involved. Once some shared agreement concerning what problems need to be addressed has been reached, inquirers can move on to consider 'ideas for action' that might bring improvement. This phase of debate is approached by first considering ideas for the system to be served and then considering ideas for the serving system. (nb this builds on the ideas expressed in the paper by Winter, Brown and Checkland, 1995).

During information system design it is necessary to conceptualise how to support purposeful action in some detail, particularly when considering what functionality will be required from any technological provision. A further stage of debate is initiated to facilitate both the clients and developers in conceptualising how the action might be operationalised in practice. That is, the ideas for action are 'contextualised' to create a more detailed "complementary picture" (Vickers, 1981). The intellectual device used to facilitate this phase of debate was a 'conversation for action' model.

Experiences and using Systems ideas in the NHS.

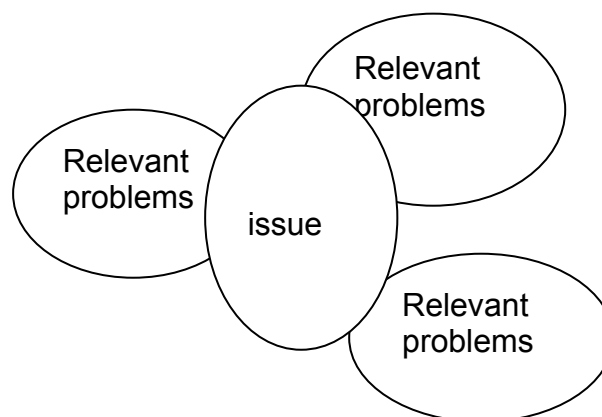
First Study.

In the latter part of the 1990's Wilson (2001, 2002) attempted to define then design a new computer based information system for a day hospital for care of the elderly. The staff were invited to collaborate in a project aimed to develop a standardised and multidisciplinary clinical record system that would be patient focused and auditable. The problem she had in the first instance was the inadequacy of the tools she was using. She began the project using methods devoted to the production of data flow diagrams and the identification of databases. The new computer system was to satisfy new procedures that were being discussed between the nurses and the consultants. Wilson had the task of designing a computer system for a group that each had their own, and often undisclosed ideas, about the information provision required. It became clear very early on in the project that the methods employed were inadequate for the task. After some literary research she decided to use soft systems ideas which did in fact allow her to make some progress but she was still dissatisfied with the results. There were many reasons for this but importantly was the conflict of opinion between consultants and nurses. The consultants became more possessive. Their role changed from being part of the team to one of authorising change. Sometimes the consultants rejected the changes and the day staff would find alternative strategies to overcome their problems. She had the dual problem of the difficulty of getting any form of accommodation between the view points and the approach she finally adopted did not enable her to produce an IS definition either. From this study she concluded that there are three elements that should be a part of a framework of ideas for information system development. These are appreciation, appropriate tools and techniques and power.

Obvious perhaps but the difficulty she had related to the unwillingness of a group of people with formal power who would not cooperate.

Second study

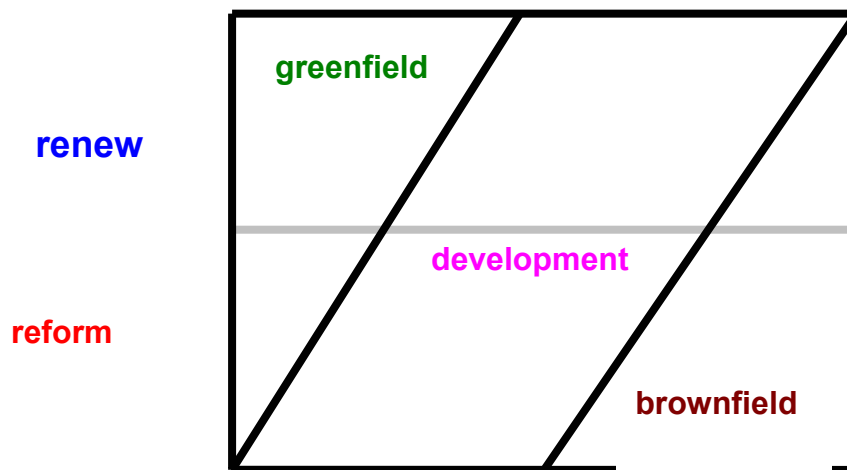
This project was related to the difficulties of the complex decisions made by psychiatrists when considering the release into the community patients that had offended the mental health act (Smith 2001). This project came about because of the failure of the actuarial approach that had been used for many years. In the past one difficulty we have found when using soft systems ideas for IT development is that there are times when the task is well defined but how it might be undertaken not fully understood by all concerned. A set of systems ideas that we have found useful is called Appreciative Inquiry Method, (AIM) (West, 1995). AIM is essentially a combination of systems maps, elements of soft systems methodology and an appropriate IT method. AIM can be useful not just as one means of working towards an IT specification but it also provides a way of structuring discussion and enabling learning to take place. Using AIM Smith was able to raise the awareness of the different groups about how they do their job. Surprising as this may seem our experience in several Hospitals both in Scotland and England is that not all involved understand the whole decision making process. For example, one comment by a psychiatrist involved in this project and using AIM said “by thinking about processes which we tend to undertake intuitively I think I’m getting a better understanding of what I actually do” (Smith, 2001). The lessons that we learnt from this and other applications suggested to us that AIM could be useful to the development of IS in complex situations. For example, if recent reports of the transfer of design and development of NHS it to local contracts are true (Collins and Rogers, 2003) then AIM could be used as a means of each party learning about each others requirements.



AIM (West, 1995)

Reflecting upon the use of IT to bring about major change suggests that an evolutionary approach is problematical. Whilst soft systems ideas are useful in many situations and can help in IT/IS development but in situations where there is a significant revolution then it may be less so. In order to make a “step-change” the

approach used should be equally as radical as the change required. Recent history of industrial change shows that moving from a situation of traditional working practices honed over many years of practice into something new made possible by technological progress is acrimonious. Tools that help understanding and guide all involved towards an accommodation are few. Some reports about the progress of the implementation of IT in the NHS make uncomfortable reading and suggest that the next phase will create a major disturbance. Perhaps with such significant changes as those implied by the introduction of IT in the NHS conflict is inevitable – perhaps the nature of such change makes it so.



Three Types of IT Implementation.

Three types of IT implementation

We propose that there are three types of IT implementation situations. The first is a Greenfield situation where the clients are either starting from scratch or a situation where the present working practices will change because of the advantages of IT. For example, an enterprise that moves into e business. The second condition is the developmental situation where an enterprise has existing IT systems and wish to improve them because of advances in IT software/hardware processing capabilities, or where the business has expanded. The last case, which we call Brownfield development, can be described as being where a situation has existed for many years and custom and practice has endured in more or less the same form for a significant period of time. In this situation powerful groups control the outcome and change is largely in their hands.

In a study into publishing in the early 1980's Stowell (1982) argued that the identification of the nature of what might be considered to be environmental

influences is important because of its influence upon the behaviour of the system of concern. This led us to suggest that whilst soft systems tools are useful in most situations, the formal authority which exists in the systems environment will determine the kind of engagement and relationships that will be involved in the change process.

Summary

We advocated that one way to address information system failure is through the use of soft systems ideas. Soft systems tools enable the client and practitioner to become an entity that together develop and design their information system. The clients are enabled to take control of the design process through these ideas. The difficulty of operationalising the ideas remains problematic. Research suggests that rather than consider a need to bridge the gap between natural language and technical language a variety of ways of navigating across should be considered. A measure of success has been gained by using conversation models. Other methods may be possible but the key point is to maintain the transparency of the journey from definition to actualization. We have also argued that there are three kinds of situations where IT might be implemented, Green-Field, developmental and brown-Field situations. Each of these approaches will require different tools primarily for the management of change.

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