

## **The Introduction of Hospital Information Systems - The Necessity for Accommodation**

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### **Abstract**

This paper examines the introduction of information systems into the new environment of the National Health Service since restructuring in 1989. Taking its approach from Soft Systems Methodology, it looks at cultural analysis in the context of the development of decision support systems for hospital managers and medical staff. Drawing on the deeper cultural analysis developed by Schein, it examines the problems which face systems developers when attempting to seek an accommodation of views between groups which not only have different system requirements but significantly different outlooks predicated by their role in the hospital environment. Particular attention is focused on the survival instincts of these two groups when faced with an environment which is changing rapidly. The medical profession is seen as one which sees its former pre-eminence within the hospital threatened. This may have adverse effects on the development of systems for doctors and managers alike but, unless the cultural dimension is addressed, solutions to hospital information problems will, at best, be partial.

## **The Introduction of Hospital Information Systems - The Necessity for Accommodation**

### **Introduction**

The growing importance of information systems to the National Health Service has been recognised since the Resource Management Initiative as outlined in Coombs & Cooper<sup>1</sup> and especially since the White Paper "Working for Patients" of 1989<sup>2</sup>. Coupled with a transformation in the organisation of the NHS and the introduction of the internal market for hospital services was a need to develop information systems enabling the new organisational structure to be more effective. The information systems being introduced have been outlined in one of our previous papers<sup>3</sup> on the subject. These changes have provided an environment which has proved very rich for the many companies marketing information system solutions to hospitals and District Health Authorities. Such systems have often concentrated on technical solutions to information problems. This is not surprising as many companies and consultants use a 'hard' approach to the analysis and design of information systems. Indeed the NHS itself has generally standardised on SSADM<sup>4</sup> and PRINCE<sup>5</sup> which have been considered appropriate systems methodologies for information and project analysis.

Emphasis has centred on data and process modelling - important aspects of any analysis and design but not the only aspect. The IMG (Information Management Group) of the NHS Management Executive has provided considerable advice and support to District Health Authorities and hospitals on data and process modelling issues.

### **The Need for Alternative Systems Thinking**

As Mary Smalls, Head of the National Health Service in Scotland's Health Analytical Unit, has pointed out, it is not always appropriate to use SSADM & PRINCE when implementing Information Systems in the Health Service<sup>6</sup>. There has been too little interaction between what is termed the 'soft' and 'hard' systems development approaches, i.e. what might be termed "what to do" and "how to do it". The 'soft' approach concentrates on what users do and what their problem is whereas the 'hard' approach is more concerned with development of the system, even though the 'what to do' issues may not yet have been resolved. The tools and techniques of the highly structured approaches are appropriate for handling the mechanistic aspects of organisational activity. The 'soft systems' approach, however, is more appropriate where issues are not immediately and obviously reducible to a logical process. The development of new information systems requires the involvement of hospital personnel working in a particular environment who see and approach their information problem from different perspectives. Many of the new systems introduced into hospitals have neglected the cultural dimension which exists within the hospital environment. There are many groups affected by the introduction of HISS (Hospital Information Support Systems). In this paper only two major groups are considered:

1. Managers who require systems to provide accurate cost-based information which can be used to:  
(i) aid cost control which has become an important feature since the reorganisation of the NHS and particularly where Trust status has been introduced and (ii) aid the contracting process with DHA's (District Health Authorities)
2. The medical staff who require information to facilitate patient diagnosis, treatment and care. The medical profession, however, is not homogeneous group; there are those who see the benefits which information systems may bring and those who view systems introduction with concern. Information related to patient treatment and the monitoring of its outcome is of major importance rather than that related to cost control.

The above groups approach the operation of the NHS from the perspective of different backgrounds and cultures. The NHS is at the minimum an 'kaleidoscope' of these cultures. There is a need to account for the cultural dimension within a hospital before identifying the systems relevant to each of these interest groups. Only when this has been understood and allowed for, do we believe that the introduction of information systems will generate the supposed benefits.

#### **The SSM model and the NHS**

The SSM model that is used here is that detailed by Checkland & Scholes in their book "SSM in Action"<sup>7</sup>. This is a model developed and refined from the earlier SSM 7 stage model and can provide insight into systems requirements in the NHS.

How can this model be applied to the situation of the NHS to best effect? Checkland and the Lancaster Group have used this model in analysing systems development within East Berkshire DHA<sup>7</sup>. The study was concerned with the problem of measuring the performance of the DHA. This model is equally appropriate in identifying key systems and issues for any interest groups within a hospital. One area in particular on which the SSM model places a good deal of emphasis and which has been neglected in any analysis of current and past systems is cultural analysis. Any organisation needs to be seen in terms of its cultural development and diversity. This is especially important in an organisation undergoing structural transformation.

However, the nature of cultural analysis in business and systems has been limited. It is not simply a question of knowing that cultural diversity exists and taking it into account superficially. It is necessary to develop an approach to cultural analysis which is based securely within a recognised theoretical approach.

One such approach is that derived from social anthropology. In a seminal paper in 1985 Shein<sup>8</sup> analysed the problem of culture using a three-layer model as depicted below. This approach can be employed to analyse the cultural dimensions within business and organisations. Hospitals are suitable for such treatment. The use of an anthropological approach can shed light on attitudes towards information technology and information systems .

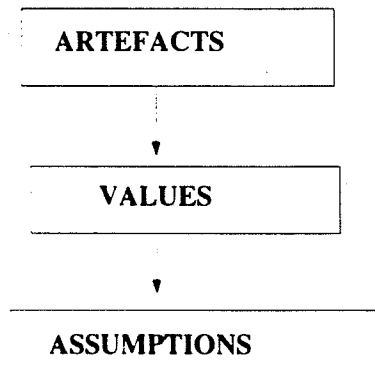


Diagram 1

At the highest level what we tend to observe within any society are its artefacts. The forms which such artefacts take are many and varied but include language, organisations and their structure and technology amongst others. In the case of a hospital society, we are faced with cultural diversity - many distinct

groups, each of which has specialised artefacts only partly understood by other groups within the environment. Medical staff have a distinct professional language; hospital managers, coming from a different professional background, particularly if they have been recruited from the private sector have a markedly different language. Whilst they may speak the same language, even the meanings of words may differ according to their contexts. The organisation of the groups are different - including specialised hierarchies and professional bodies. Such artefacts will include the systems created to support the information requirements of the group. Doctors have a technology including specialised computing equipment such as Computer Tomography. It should not therefore be taken for granted that hospital doctors, for whom computer usage is relatively low, are automatically unsympathetic to technological developments in this area but they are confronted by information systems associated with hospital managers and seen as part of an alien culture.

Underlying the artefacts of culture are the values which result in the creation of such artefacts - these are the aims, goals and particularly the concepts with which each group equips itself. The aims of the hospital manager will, for example, include that of ensuring the long-term financial viability of the hospital. An organisational structure and a technology will be created which will lead to the fulfilment of this objective. Whilst this is not an aim to which medical staff would object, it will be less important than the aim of good patient care.

Even the values of a group do not form the lowest layer in the model. For any group in society there are assumptions upon which the group's values are actually predicated. Such assumptions fundamentally determine how groups operate within society and determine inter-group relationships. Groups act in society to ensure their survival. The survival instinct remains strong even in circumstances where life is not immediately threatened. If the survival factor is omitted from cultural analysis, it is difficult to make sense of attitudes to and use of information systems. The ways in which groups act in society can be understood in terms of four distinct categories as depicted in diagram 2 below.

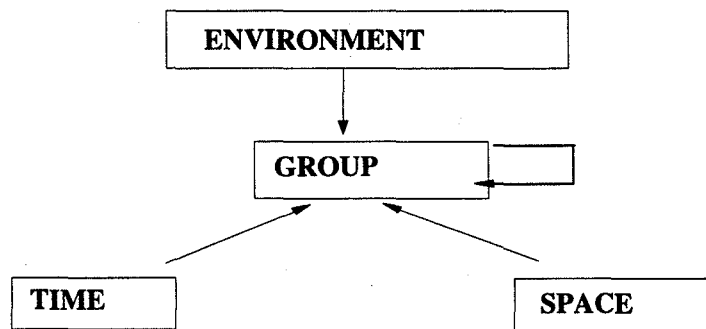


Diagram 2

1 The group and its environment

A group develops a relationship with its environment in order to survive. There are three possible outcomes. A group may:

- i) master its environment,
- ii) may be mastered by it
- iii) harmonise with its environment.

In the UK, the medical profession has historically dominated the hospital environment. In the 1980's government reformed the organisation of the hospitals and hence the environment within which doctors worked. No longer was it one where they were supported by administrative staff but overseen by managers. At best, the medical profession could harmonise with the environment. This was a threat to the independence of doctors as a professional group and hence to their survival.

## 2 Within the group

The environment may also change to affect the relations within a group. This can be seen most clearly in the relationship between general practitioners in the community and medical staff in the hospitals. Historically consultants have been an elite within the profession compared to general practitioners. The changes in organisational structure - particularly in the introduction of fundholding practices - has begun to shift the balance between hospital doctors and the GPs bringing a monetary as well as a professional dimension into the relationship. This has been manifest in the use of information systems. A decade ago the use of computers by consultants was far more widespread than use by general practitioners, albeit for research purposes. Now the situation is quite different. Use of computers by general practitioners and their staff has grown rapidly, with more than 60% of general practice in the UK having practice systems by 1990. It is estimated that not more than one hospital doctor in 100 uses computing facilities. As an independent profession needing to claim all of the allowances and fees from their Family Health Service Authorities for treating patients in the community, adoption of IT by GPs has been a necessity for survival in the new environment. Hospital doctors have no need of information systems for such survival reasons.

## 3 In relation to Space

A group may control the space that it occupies. This can be social space as well as physical space. Technology can be seen as an invasion of space. The medical professional will see information systems as the technology of an alien culture if its primary use is for cost control. It is therefore difficult for managers to introduce information systems even if they are aware that the medical profession has a different culture, since no account has been taken of the basic survival assumptions.

## 4 In Relation to Time

Groups have a relationship with time which is either forward- or backward-looking. The medical profession has a long and distinguished history and can derive status from this but it can result in it being backward-looking. Recent changes in hospital organisation encourage some to reflect on a 'golden' age when control was more firmly in their hands. On the other hand managers have no historical perspective in the health service and will therefore be forward-looking, seeking to develop initiatives which will result in their future survival. From the doctors' viewpoint, managers and their information systems represent a threat for their future to which a response is a desire for the past.

## Implications

What therefore are the implications of this deeper cultural analysis for the application of soft systems methodology in the development of information systems within the hospital environment? There are reasons to believe that far too optimistic a view of the development of systems prevails partly because group survival is not taken into account. In other words, account is being taken of the artefacts and values of groups but not of the underlying survival assumptions which determine the nature and form which the upper layers in the model will take.

1. Simple acknowledgement of the artefacts - for example, the information technology and information systems - which groups are prepared to use is at best superficial. It may result in the addition of certain functionality to existing systems but is unlikely to address the fundamental needs of a group.
2. A simple list of cultural issues which have to be considered in systems development is at best a partial analysis since there is little understanding of how these cultural issues come into play or indeed what can be done to allow for such cultural issues. Furthermore there is little predictive power in such analysis since the list tends to become ever larger as each author takes into account an additional factor which is considered important.
3. Even an understanding of the aims and objectives of any group will not necessarily help since aims and objectives change over time and are only a manifestation of survival factors.
4. Policy towards the introduction of new systems technology will be flawed. When account is taken of the differences in the artefacts used by groups and when necessary changes are explained to groups concerned, it is assumed that they will then, perhaps reluctantly, embrace changes and modify their behaviour accordingly. There is an analogy here with political parties which often mistakenly believe that changing the way in which policies are presented will result in acceptance of such policies even though they are not congruent with voters' survival instincts. Analysis of the survival aspect of culture, however, indicates that, in order for medical staff to use information systems, those systems must be necessary for the survival of the group and enhance the position of that group.

How does this relate to the actual and potential HISS? In a previous paper<sup>3</sup> we presented a model of the transformation process within the hospital environment. This model attempted to show that although managers and the medical side of the hospital have different input, transformation and output, there is an area of overlap which means that an accommodation between all the parties involved will be necessary if 'new' systems are to be effective. However, the analysis of the cultural dimension throws considerable doubt over how this may be best achieved. In the paper indicated, we treated the patient procedures component as a 'black box' which contained one 'view' of patient procedures. The analysis now being conducted suggests that great care will have to be taken in consideration of the cultural dimension which underpins the user attitude to such procedures. All embracing Hospital Information Support Systems are likely to be inappropriate and have proved very slow to develop and costly to implement besides. The Case Mix Management Systems which have been introduced so far have been of two distinct kinds as previously reported<sup>7</sup> - those which have incorporated patient care information for the benefits of the medical staff and those which have concentrated on the basic case mix and costings. The outcome of our analysis suggests that separate systems dealing with the concerns of managers and of medical staff would be most appropriate since there would be minimal conflict of interest but such systems would need to co-operate both in terms of data transfer and in terms of information provision if the goals of both managers and doctors are to be achieved.

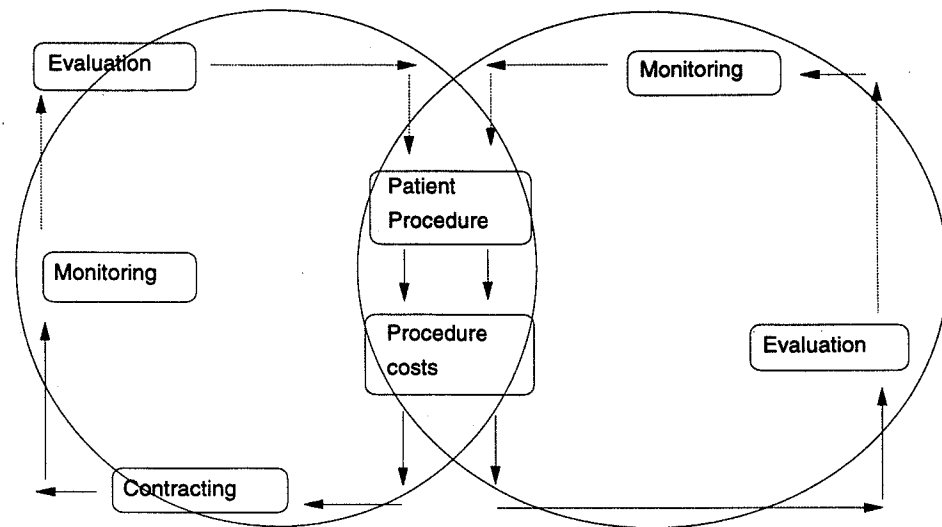
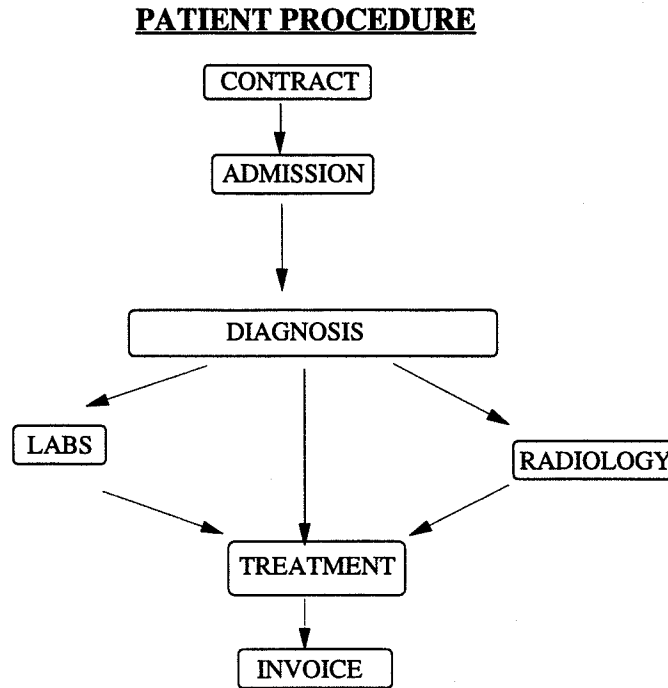
Decision Support Systems

Diagram 3

Diagram 4 depicts the detailed components within the overall patient procedure. As can be seen there will be a number of possible systems relevant to these procedures, all having their own interest groups with a view to how the system is and should be working. Some of these systems are already in place. Those for example, used by radiologists and pathology technicians. There needs to be an investigation therefore that looks at the roles and systems within each grouping. Each grouping of course will not be an homogeneous whole. There will be conflicts within each group. For example, some clinicians are pro technology and some anti technology; some nursing managers see data required for patient care as being limited, others such as some hospitals in the North West see the need for detailed specifications for data requirements. Each of these groupings will have their own relevant system which if not recognised will lead to a HISS which has major dysfunctional elements. The dysfunctionality may also depend on which groups within the hospital environment the information systems are seen to help. The success of existing systems in specialised areas within the hospitals results in part from the fact that they have been specifically targeted at and tailored to the needs of that specialist group (i.e. in general one relevant system). The difficulty with systems such as Case Mix is that of trying to meet the needs of groups which do not have the important element of a common culture. It is likely that separate but co-operating systems which take into account different groups cultural dimension will be more successful than an all embracing HISS.

The aim of the new information systems within a hospital environment is to bring all these systems together to generate an overall Hospital Information System via perhaps a client/server architecture.



**Diagram 4**

**Conclusion**

Hospital managers see decision support systems as essential for their survival as accurate cost and accounting information is needed. Doctors do not see information systems adding to their power or enhancing the survival of their group in the hospital environment.

Within even an approach such as SSM therefore, we have to be very careful about the nature and form of the analysis. Essentially the issue is whether a decision support system such as Case Mix Management can be effective without an acute awareness of the cultural dimension at the time of systems development.

We aim to investigate as part of our research the systems that doctors and managers see as relevant for their survival; we would expect them to be very different. We hope to suggest appropriate strategies to deal with the cultural dimension.



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