“Minus nine beds”: Some Practical Problems of Integrating and Interpreting Information Technology in a Hospital Trust

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Abstract:
This paper presents findings from the Dependability Interdisciplinary Research Collaboration (DIRC) project. The focus of this paper is ‘bed management’, how the availability of beds is managed on a daily basis. Using ethnomethodologically informed ethnographic research techniques our paper reports on some of the complexities involved in the use of technology in the provision of bed information, the production and utilisation of that information in everyday managerial work, and the factors relevant to information use in managerial working practices. We argue that providing IT support for such contingent managerial work requires that systems necessarily pay attention to the occasioned character of activities. If the aim is to embed knowledge properties in management information systems then it needs to be captured and managed in a way that will make it accurate, available, accessible, effective and usable. Such a task is not a matter of simply automating existing records or procedures.

Introduction: new technology and organisational life.
This paper presents preliminary findings from the Dependability Interdisciplinary Research Collaboration (DIRC) project, a collaborative six year research project examining issues of dependability in a number of organisational settings, including hospitals. Hospitals, as part of a national policy process whose aim is standardisation of work practice and improvements in the delivery of healthcare, are increasingly using information technology. Healthcare institutions are particularly information intensive and IT increasingly plays an important role in healthcare delivery and management. The challenge for the NHS lies in using information systems efficiently. Healthcare information systems are intended to provide major benefits in support of patient care; in organising and locating clinical information; in coordinating and managing patient healthcare; and in organisational integration.

The focus of this paper is one aspect of everyday managerial work in a hospital trust, namely ‘bed management’, how the availability of beds is managed on a day to day basis. Our paper reports on some of the complexities involved in the use of technology in the provision of information, the production and utilisation of that information in everyday managerial work, and the factors relevant to information use in managerial working practices. We deployed ethnographic research techniques - involving the researcher’s immersion in the field of study and the provision of a detailed descriptions of activities - which have increasingly been utilised in studies of technologies in use (Hughes et al 1993; 1994). The advantage of this approach lies in
the ‘sensitising’ it promotes to the real world character and practical context of activities. Our research involved shadowing various hospital managers - usually for a week at a time - documenting and tape-recording their everyday, practical activities moment-by-moment as they occurred (see also Clarke et al 2001) observing and documenting whatever they were doing with technology or as 'managers', moment-by-moment.

Managerial Work and New Technology: some observations from the field - 'Bed management'

- “...it came down from on high that this year there would not be a Winter crisis.”(Trust Manager)

Observations of the management of waiting lists and bed management illustrate the value of IT in coordinating work across different sites and different organisational units. In particular it illuminates the complexity of managerial work with the figures produced by the technology needing to mesh with more local, changeable and situated information. Hospital waiting lists and the availability of hospital beds is inevitably a highly charged political issue. At the time of the observations a great deal of concern was given to 'Winter planning' which was, in turn, related to previous national press reports, of hospitals being closed to new patients or patients waiting on trolleys. This concern was reflected not just in a daily managerial focus on bed numbers but also related statistics connected to waiting time on trolleys and the 'escalation policy'. The 'escalation policy' was linked to a government requirement that no patient should be kept on a trolley for more than 12 hours. Trolley waiting times were closely monitored and the Trust had contingency plans to open up a day-case theatre to accommodate more beds and patients. The ‘bed availability’ data is available on the Management Information System (MIS) but is inaccurate for a number of reasons. Bed management was associated with a system of alerts that instigated various managerial responses: "to go to red (alert) the Directorate Manager has to go and count.. if the position is that we (the Hospital) are ..closed to admissions the Directorate Manager has to come in and physically count the beds ... Ward Sisters can be naughty .. if they know they have five admissions coming in tomorrow ... you can understand where they're coming from ..". The managerial focus on bed management was supported by the collation of a weekly site report circulated by email, for example;
"Weekly sitrep attached for your information. Large volume of medical sleepouts at both main sites. Current position:
XXX: no available beds now although position will change. Some elective admissions for today being cancelled and admissions for next 2 days under review with relevant clinical directorates.
ZZZ contacted by GGG last night to take medicine emergencies from south of GGG area… some patients at ZZZ still waiting for beds at DDD to become available"

The availability of hospital beds across the two sites is co-ordinated by the Bed Manager (BM). The role of the BM is to constantly monitor and maintain the process of bed management in such a way as to avoid a situation where no beds are available. This is best explicated by reference to events that took place during the period of fieldwork.

On arrival one morning at one hospital (in a three hospital trust) the Directorate Manager of Orthopaedic’s (DMO) first words were “We’re minus nine beds”. It became apparent that there was some kind of ‘bed crisis’ happening - assumed to be caused by a road traffic accident by the staff present -- and that the DMO would be taking some action to determine the position of her directorate. The reference to ‘minus nine beds’ was to the state of play across all three sites, not only within the orthopaedic directorate, and this information had come from the BM. Although the ‘minus nine’ was referred to as being the “state of play”, it actually referred to the situation if all patients were admitted as expected for that day. The DMO said that she needed to go to the orthopaedic wards to assess the situation, adding, “we go through our usual rituals for situations like these”. On the way to the wards the DMO said that it was essential to physically survey the wards rather than trying to get information another way e.g. by telephone. She said that this was a process of “chivvying people up”. Exactly what this meant became apparent once we arrived on the wards. First, the DMO walked around the floor of orthopaedic wards and did a count of seemingly empty beds. She then went to the nurses’ station where there is a noticeboard that represents the bed situation. The notice-board represented the total ward area, with each ward ‘bay’ (usually comprising six beds) marked separately. Each bed is represented by a metal slot where a card, with the patient’s details, can be placed. Cards that have been placed straight into the slots represent existing in-patients. Cards placed diagonally in the slots represent patients due to be discharged, pending a visit by social services, a consultant, the physiotherapist etc.
The presence of diagonally-placed cards forced an immediate re-count for the DMO, as her count was based on a ‘head-count’ of patients present. The DMO then discussed available beds with the ward sister, who explained the expected time/date of discharge for the ‘diagonals’. The ward sister also pointed to two cards for existing in-patients and explained that they were acutely, terminally ill but said that she “couldn’t guarantee a day or time for them”. The DMO then left the nurses’ station and went to speak to the physiotherapist to ascertain whether there were any other patients who were fit for discharge or who were likely to become so that day. Through these processes, the DMO established that there were enough beds to see them through the ‘crisis’. On leaving the ward area, the DMO said that establishing the availability of beds is “a very physical thing”.

The observations reveal how apparent solidity and objectivity of managerial information can thus continually be challenged as new data come to the fore, for example, where supposedly 'occupied' beds become available. Understanding of the data is facilitated through reconstructing the available information; that Ward Sisters were 'being naughty' or that some of the beds are occupied by 'walking wounded'. Thus readings of the bed management data are ‘defeasible’, capable of being re-interpreted to fit with new items of information and presented to different audiences.

What we observe in the work of bed management is that the process is difficult and eventually what emerges is a few 'quick and dirty' figures on which to make a judgement - what Anderson et al (1989) a 'wild eyed guesstimation' (Anderson et al (1989)). "This work involves grappling with the sheer practical difficulties of determining which figures are wanted, pulling them out, and then knowing how to manipulate them and assess their product.” (105-6) It is not simply a question of medical staff seeing what is 'in the bed management figures' and then automatically working out what should be done. 'What is in the figures' is itself something that has to be worked out, and working it out involves balancing operational and organisational objectives and priorities. The bed management figures and the bed management board are then the end product of a series of procedures. These procedures make up a system of calculation and are designed to give a picture, a representation, of the 'bed position' of each ward. But this
picture is neither clear nor unambiguous since the figures are embedded in a nest of interactional, organisational and operational contingencies and gets its meaning from them. The question then becomes - given the system of calculation that bed management is embedded in - how is the formula to be applied in specific cases? What are the determinants of its applicability? What are the requirements of making it work? The use of judgement in calculation is part of the work and for the hospital success depends upon managing the interplay between precision and interpretation in calculation.

Any explication of the work of managing the bed management system, of making a system of calculability work has to address what, for some specific occasion, constitutes correctness, allowable error, the margins of probability and calculability. Whenever there is a 'crisis' - an accident, political pressure, demands on targets or whatever - the figures are subject to reinterpretation and the calculations are subject to change. Such a finding has some repercussions in terms of the extent to which existing systems can be automated or 'computerised. The knowledge which anyone working within the system possesses and uses is a locally organised corpus and is unavailable to analytic reconstruction as a collection of abstracted cases and idealised procedures. There is no authoritative list of what personnel know about the bed management system in any particular medical ward and their peculiarities, nor when this knowledge is to be relevantly applied as a set of general guidelines. At best all that can be achieved is to attempt to apply the system of calculation as consistently as possible. However, any application of the system must allow others to follow it to see how the result - in the form of discharging walking wounded, setting up extra beds etc - was arrived at.

Bed management and the bed management figures impact on other aspects of managerial activity and reporting - most notably in managerial calculations of activity, bed occupancy and patient turnover, all of which are relevant both in terms of the in national calculations and audit of performance. A great deal of managerial work is consequently devoted to untangling, interpreting and re-calculating the statistics on activity and patient turnover to take into account the process of bed management. Its not that the statistics are not trusted, they are not regarded as 'just any old numbers' but that their limitations are recognised and related to how there are collected and
collated. So, for example, although activity figures are provided on a Ward basis this is affected by such things as 'sleep-outs' - where patients from another Ward are moved into any unoccupied beds. The Unit Manager needs to extract 'her patients' and 'her doctors' from the figures in order to gain an accurate account of occupancy and length of stay to generate any performance indicators. Managerial work in these circumstances is not necessarily simplified by the widespread use of new technology.

**Why does it matter?: managerial work and the design of IT.**

What clearly emerges from our observations of managerial work is its complexity. Much of the ‘organisational knowledge’ regularly utilised in the managerial work of coordination and decision making is not of a kind that is transparently visible in procedures or simply facilitated by reference to the record. Providing IT support for such contingent work requires that systems necessarily pay attention to the occasioned character of activities. If the aim is to embed knowledge properties in management information systems then it needs to be captured and managed in a way that will make it accurate, available, accessible, effective and usable. Such a task is hardly a matter of simply automating existing records or procedures. These accounts of everyday managerial work would merely be a series of interesting stories was it not for the implications such accounts have for the design of new technologies and the support of working practice. Our research highlights a need to attend to some of the everyday realities of organisational life. As design attempts to accommodate some of the complexities of organisational working, so the challenges facing systems designers necessarily increase. These new challenges involve attending to the lived reality of organisational groups - much as we have described it here - in order to design effective systems.

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**References:**

DIRC see http://www.dirc.org.uk/