Leading Article

Clinical computing systems: their slow introduction

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The contrast between the apparent need for clinical computing systems and their slow establishment is well recognized.^{1–4} The ability of such systems to solve some of the problems associated with the traditional medical record is also well recognized. Yet after almost 30 years of endeavour and the development of many different systems the number in daily use is relatively small.

This contrast was noted 20 years ago.¹ When inappropriate computer languages were blamed. Other reasons advanced over the years can be divided into technical and personal/professional.

Lincoln⁵ summarized the technical reasons as: inefficient computer languages, computer scientists side tracked into esoteric applications, i.e. diagnostic systems, software designers unable to meet all doctors' demands, and doctors unable to keep up with the rapid changes in technology. Whilst at the time these complaints were justified the very major changes in both software and hardware plus the body of experience built up in developing clinical systems have largely negated these.

Personal/professional reasons included: life long habits not changed easily,⁶ doctors as independent practitioners not sympathetic to being asked to change their working practices,⁶ loss of self esteem on using these systems,⁶ medical care becomes impersonal and cold when computers are used,⁶ threat to jobs and status⁷ and cost/benefit ratio not advantageous to doctors.⁸ More recent work has shown that professional workers, far from being intimidated, view computer systems as submissive, non-frightening sources of artificially generated intelligence.⁹

Other studies show that doctors are not against computer systems. Typical conclusions are 'clinicians were accepting of computers as long as they were used as a clinical tool and not as a replacement for them'.¹⁰ 'Physicians held a positive and not a negative view'.¹¹ 'Attitudes of doctors were more positive than other grades of hospital staff'.¹² 'Medical faculty staff perceived the computer more positively than interns, nurses or ancillary workers'.¹³

A survey (WMS) amongst 846 consultants of the West Midlands Regional Health Authority showed a widespread contact with computer systems.¹⁴ Of the 471 who replied 39% said they used a computer at home and 67.5% at work. These responses argue against widespread resistance to the use of this technology.

Doctors should be fertile ground for the use of computer systems as another survey showed that experienced users had a more tolerant attitude to the difficulties of using computers, whilst inexperienced users had a negative attitude rather than a less positive one.⁹ The WMS¹⁴ suggested that the major features of computer systems should be ease of use, realistic and sound advice if it was a consultancy system, reasons stated for a particular recommendation, and improved cost efficiency. These findings were similar to those of Teach and Shortliffe¹⁰ on whose questionnaire this survey was based.

Most of these concerns are addressed in more recent development but introduction is still patchy. If we are to find the cause of this then we have to analyse the doctor's working environment more carefully. Use of computers here does not mean the buying and maintenance of systems, the development or evaluation of software, data entry, arranging for the output. It covers such matters as deciding what information to record and how often, specifying the content of regular reports, their content and frequency, ensuring the correctness of clinical data, and making such data available. The technical and the personal factors referred to above are largely external matters, i.e. 'hygiene factors' in modern management parlance. These have to be right for the systems to work, but in themselves they do not guarantee acceptance.

To determine the conditions for acceptance the basic characteristics of a doctor's job need examination, not just training, knowledge and experience but the features of medical practice they find attractive, what types of working conditions are congenial. This can be considered in two stages, firstly, the working environment or framework, and secondly, the essential or core tasks of the job.

The first is a specification of external features, that is outdoors vs indoors, static vs mobile, fixed

hours vs irregular hours, and so on. The core tasks include the essential activities which make up the job, that is talking with people, training, preparing reports, dealing with numbers, and data recording. Zoltan-Ford, in her survey of the attitude of accountants, attorneys, doctors and pharmacists to computers, found that a positive attitude to computers was increased by experience of them.⁹ But why should some groups have this greater experience? She suggested they sought it. The same appeal which made them choose their occupations in the first place also lead them to use computers.

If allowed to, people choose jobs which attract them, which give fuller scope to their particular talents and which do not require attributes they do not have. They will choose to work with those things they feel comfortable with and which aid them in doing their job. Some like to work indoors, and others outdoors, some in one place, others moving about, some dealing with people, others with ideas, some dealing with numbers, others with more unstructured situations.

How can clinicians be characterized? Examination of the medical record may provide a clue. It is generally recognized to be disorganized, lack structure, be incomplete, and pose difficulties in finding specific pieces of information. In some strange way this may reflect the hurly burly of daily medical practice. Individuals who can tolerate this and in fact prefer it to the rigid formalism of a well laid out typed document are unlikely to find a well ordered and structured environment attractive. Nor will they be sympathetic to tasks which require an ordered approach. Every patient, every example of a disease, is different and presumably this variability is an attractive part of clinical practice.

The framework of a doctor's job can be summarized as variable, both in the range of activities and variation in the same activity, dealing with people, coping with unexpected demands, not tied to regular times, freedom to choose when and to an extent what to do.

What are the core features required to perform any job?—the essential activities which make up the major part of the job. A lorry driver clearly has to be able to drive, and an artist paint. A production manager needs to use budgetary control to ensure that he is producing enough of his product at a price and of a quality which will yield a profit.

If asked to order these three according to their likelihood of using computers we might say manager, driver, and then artist. It seems reasonable to match the skills and attitudes required in the job with those needed to use a computer. The closer the match the more likely the individual is to enjoy using a computer. Obviously this technique will only provide a rough guide. There are too many unpredictable aspects. If asked to rank all managers, against all drivers and all

artists then a closer approximation to the correct order is likely.

What is the core activity of a doctor and is it more or less likely to bring him nearer using computers? The first is difficult to answer but intuitively it is taking decisions on uncertain and incomplete information, a task shared by most executives and professional people.¹⁵ More simply it is the exercise of judgement. Individuals who operate successfully in this environment are exercising the higher skills of recall from experience, discrimination between relevant and non-relevant items, judgement, and attaching a degree of certainty or confidence to the decision. Finally they have the emotional resilience to stand behind their decisions and bear the consequences.

By its nature this type of decision-making is unstructured, bitty, variable, at times unclear, hard to justify sometimes and has all the characteristics of an open situation. Even superficial consideration suggests that individuals who find this type of work attractive will not take to a formal and structured situation. Such a method of working will be found boring, repetitive, irksome and irritating.

Hence this individual will not find using computers easy. Their demand for precision and order will irritate him. No one can do a job successfully if they do not feel comfortable with the main part of the work. Also as independent practitioners it is extremely unlikely that doctors will do anything for any length of time which is not congenial to them. It is this mismatch between the essential core of a clinician's job and the demands of using a computer system which accounts for the slow introduction of these systems, and the paradox between the need on one side and the non-use on the other.

Conclusions

Can this viewpoint be reconciled with the need for medical information for resource management and allied tasks? I believe so if these points are followed.

1. Stop trying to get clinicians to use computer systems to provide management or even clinical information—even if the information seems potentially useful to them. Apart from about 10–15% of computer enthusiasts it will be a waste of time in the long run.

2. Do not think that most doctors will wish to access data through computer terminals or even consider computer-produced data on a regular basis. They are not basically interested in ongoing budgetary control. If there is a point which requires the attention of the doctors, for example excessive lengths of stay, or overrun on the drugs budget, then prepare a report detailing the problem with the supportive evidence, and give it to them for their consideration.

3. Design information systems that do not need doctor input. Virtually all clinical information can be obtained without their help. Drug usage data should be derived from pharmacy computers where the information from written prescription is entered by pharmacists or clerks, not by trying to get doctors to use computer based prescribing systems. The same principle should be used for all doctors' orders.

4. Where there are clinical items of common interest to managers and doctors (accurate diag-

nosis or operation are virtually the only two which spring to mind) give more than enough support to capture this data.

The pursuit of the impossible leads to disillusionment and frustration. Clinical information is vital for care and running the service but the most obvious way of capturing it, by relying on doctors, does not work. With this realization and a little imagination the problem can be solved for the general benefit of the service, clinician, patients and, these days, politicians.

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