

Editorial

Usability: a critical dimension for assessing the quality of clinical systems

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Introduction

Increasingly, electronic patient records (EPRs) and other information systems are used at the point of care,¹ yet it is unclear how we decide what constitutes a quality system appropriate for use within a clinical consultation. Individual systems have been adopted as a result of end user 'pull' or managerial 'push'. End user needs tend to focus on simple clinical needs such as eprescribing and referral. Public policy tends to focus on the tangible benefits of a computer on the desk (such as safer prescribing, legible records etc.) and therefore to promote their adoption.^{2,3}

This editorial explores the importance of the effects of the increasing presence of the computer on the formerly dyadic doctor–patient interaction.⁴ Its focus is on what makes a system usable and possible to integrate into the clinical workflow, and what needs to be done to overcome the barriers to implementation.²

Quality is defined as fitness for purpose and inevitably users and service managers have different priorities. When a clinical system is not fit for purpose in the clinical setting clinicians won't use it, or they will develop ways of working around it, often using non-

clinical staff to meet data recording requirements outside the clinical setting. This latter is expensive and introduces risks of inaccuracy. Even if a system is fit for purpose, there is often a fine line that distinguishes between greater efficiency and errors due to semi-automatic behaviour, memory lapses and other cognitive issues.⁵ Central procurement processes may define fitness for purpose in terms of health service managerial goals, rather than usability within the clinical setting. The 'Choose and Book' application in the UK (allowing realtime booking of outpatient appointments) provides an example of an application very hard to use in the clinical setting but which may improve attendance.^{5,6}

Evaluation methods are needed that could be applied to clinical systems in development to minimise the risk of expensive failures. This editorial makes the case that direct observation using enhanced video techniques should be used as the primary method to assess usability in the clinical setting; we also propose that accreditation standards should be rebalanced to make usability a priority.

Appraising the quality of information technology (IT) to be used in the clinical setting

Appraisal of clinical systems should include appraisal of their use in the clinical setting and direct study of that environment. Evidence now supports a three-part process that could improve certification and accreditation standards – Figure 1 shows where these processes (found in the ellipse) fit into a total system design/build/deploy pathway. Although part of this process is represented as a sequence, the process needs to be agile, with user involvement throughout. Redesign is seen as part of the development process; an inevitable consequence of proper simulation testing and controlled release and a option to be preferred to system failure.

Laboratory testing and simulation-based testing

Many of the problems associated with health information technology can be prevented by greater adherence to usability heuristics. Standard techniques of usability inspection (e.g. heuristic evaluation, cognitive walkthrough) and testing (e.g. think aloud protocols) could reveal many of these problems.⁶ More issues could be discovered by laboratory testing in an environment simulating the actual clinical setting.⁷

Direct observation of EPR in the clinical environment

Video observation has shown itself to be the best way to assess consultations from an interaction perspective,^{8,9} with its ability to record both sound and the

detailed physical activity that occurs. Such studies demonstrate the impact of systems and the changes that occur as the computer manifests its presence in physical, informational and social ways. Indeed, the true benefits of having an EPR will only be realised when we move beyond the idea that it is simply information that was once recorded on paper. And that will only occur if we continue to expand our understanding of the means by which humans in the consultation can interact with the computer.

Whilst literature abounds on the usability of software in general, only one study has examined the specific needs of the medical profession.¹⁰ Video observation remains the best way to test the complex issues that arise in integrating the computer into the consultation, and is a process that can be used in scenario testing⁷ and in live consulting situations.^{11,12} Such methods are now validated and reproducible; they can produce outputs which software engineers can interpret to develop better systems.¹³ Such feedback from video observation and analysis can and should be applied in testing systems before they are released for real use by clinicians, and in particular for use during doctor–patient interactions.

Observation of the physical environment in which the system is used

The use of systems in the clinical setting is limited by the physical constraints within which they are used, and many of these date from a time when paper reigned supreme. Of particular importance in the primary care setting is the relationship between the desk computer and patient's chair. Some doctors sit their patient opposite, making sharing of what is on the computer nearly impossible; whilst others have their patient sit alongside them. These layouts facilitate or inhibit the computer being used as a shared resource.¹⁴

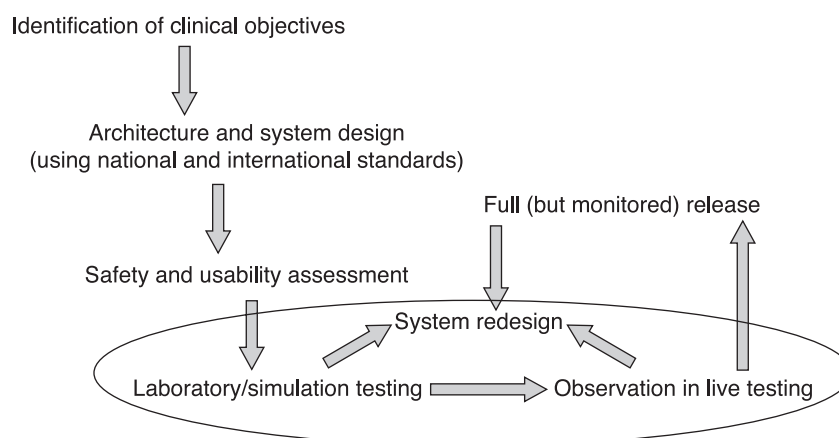


Figure 1 Components of a process of usability testing

Refocusing of local, national or international accreditation standards

Accreditation standards need to go beyond ensuring consistent functionality, common data formats and interoperability. Implementation of clinical systems often involves either a subsidy or direct provision of approved software (the path taken in the UK) or some sort of accreditation process (a role undertaken by the Office of the National Coordinator for Health Information Technology in the USA, and the National E-Health Transition Authority in Australia), allowing a more market driven approach. Although these ensure consistent functionality such approaches treat the computer as a tool within the consultation. Accreditation usually concentrates on the activities of the tool – the provision of recall systems, coding structures, facilitation of data sharing, interoperability between systems and so forth. Yet whilst addressing these areas has been very important in the development of computerised health records the computer is much, much more. The computer is part of the interaction rather than simply a provider of information. The methodologies and expertise now exist to develop national and international standards of usability that could be applied and tested using the processes discussed above.

Conclusions and recommendations

It is important, if not crucial, that prototype systems are tested in both simulated and live environments. The development process should include scope for redesign of any interface if required.

Non-clinical objectives, though important, should not trump the clinical purpose of any medical information system, namely to facilitate the relationship between the clinician and the patient and support their joint decision-making processes. Too often systems are procured to meet management objectives (e.g. 'Choose and Book' – the NHS online clinic booking service) rather than to improve clinical care. Testing of new systems in their intended environment will reveal whether they are truly fit for purpose and help shift the benefit–risk balance to the benefit side.

If we fail to take on this agenda we will continue to get the EPR systems we deserve. A nightmare scenario is that health service managers will opt for systems which may help solve their problems but are hard to use in the clinical setting. Usability testing of clinical software should be an integral part of any testing regime, as should the development of standards to govern their design. It is time to routinely incorporate usability testing involving video recording into system

testing, and in particular into system accreditation and certification processes.

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