



Creating futures between Interaction Design and Medicine

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EDITORIAL

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Interaction design and the medical profession are perhaps unlikely bedfellows. However, a review of a recent discussion shows that the use of digitally based techniques for interacting between patient and health professional, and between health professionals, has become almost ubiquitous. The ever-increasing presence of applications for web enabled mobile devices such as the iPhone and Blackberry are having a marked impact on the health profession. For example the extensive drug database Epocrates that's available on the iPhone, claims to be used by 100,000 doctors. Other popular mobile medical applications include Medilyzer and Procedures Consult which provide drug references and educational material to medical students and professionals. (Hamou, 2010)

The use of digital devices in healthcare is not new per se. The collection of data from patients using the The LINC-2 computer was discussed as far back as 1966 in the New England Journal of Medicine. (Tiplady, 2010) As computing power increased and computers became smaller in size, their use started to move from specialist research facilities in the 1980s, to more general use. Personal computers became common, screens got larger and the introduction of the touch screen allowed users with no experience of computers to indicate their selection directly. (Tiplady, 2010)

In the 1990s the use of touch-screen technology was being trailed to evaluate how effective it was in delivering patient quality of life surveys. (Velikova,G.

Wright, E.P, Smith A.B, Cull, A. Gould. A,Forman.D, Perren.T, Stead.M, Brown.J, & Selby.P.J. 1999). The introduction of Personal Digital Assistants (PDA) and tablet style portable devices was the next major development in interface design that proved to be extremely useful in a clinical setting. Recent examples include the introduction by Apple Computing of the iPod touch system in 2007 and in 2010 the iPad.

Hamou says, "The use of ubiquitous computing devices (especially smart mobile phone technology) for collecting data is better suited in a high tech hospital environment." (Hamou, 2010) The user experience of these devices plays an important part in the success of their use in evaluating patient quality of life. Medical and patient information on mobile devices may well become a key part of the patient experience of healthcare in the near future. Some observers suggest it even mirrors the boarder experience of human computer interaction. (Falchuk, 2009)

Looking at what interaction design offers may help to inform patient focused innovation and the design of patient quality of life surveys (PQL) designed for digital devices. Gillian Crampton Smith (Moggridge 2007) says interaction design is "about shaping our everyday life through digital artefacts." She suggests that one of the challenges for designers is making technology fit into people's everyday lives instead of having their lives dictated by the vagaries of technology. Interactive systems in the past have tended to focus on the technology that makes them work rather than the people who use them. Crampton-Smith suggests that people are the reason for developing these systems and we must design FOR them. Likewise Mitch Kapoor who created the spread-sheet programme Lotus 1-2-3, states that we must consider designing so that software and hardware are fit for the purpose people will use them for, rather than thinking first about how to build them. (Moggridge 2007) Designing for function only, not how the program communicates, risks the intent of the design being



misinterpreted and can mean that an opportunity to enhance everyday life is lost.

Understanding the everyday experience of a hospital patient can be assessed using a variety of patient quality of life tools. The use of these tools via a digital environment within the hospital context has been trialled for some time. (Ellis, 1987 cited in Holzinger, 2003) Tiplady comments that the concerns raised in the early evaluation of interactive systems for assessing PQL are much the same as issues being raised today.

The benefits of using a digital system include improved accuracy, elimination of missing or inconsistent responses, ease of use and a simplification and streamlining of data handling processes. However, some concerns have been raised about patients who may be reluctant to use computer based systems as well as the cost, security/privacy issues and their reliability. (Tiplady, 2010)

The integrity and quality of data collected using a digital device (Touchscreen, iPad or iPhone etc) has been shown to benefit in the elimination of ambiguous responses and in reducing answers to questions in for which no response is given. (Hanscom, 2002 cited in Tiplady 2010) Larsson's (2006) findings indicated that touch screens gave similar results to paper and pen surveys, were easy to use and importantly contained complete sets of data. (The patient could not skip a question to go forward, however they were able to go back and revisit their answers.) In the pen and paper surveys conducted 14 percent of the patients omitted data. (Larsson, 2006) Missing data is a major issue in the analysis of questionnaire data and although there are statistical methods available for dealing with this, Tiplady (2010) comments that it is more useful to reduce missing questionnaire data in the first instance.

The management of data is where the use of digital devices really come into their own. With a paper based survey, responses need to be interpreted, data entered, proof read and analysed. This can be time consuming and costly. With a site based digital PQL survey, data is captured on the device and transferred electronically to a central database. This saves time and cost. As Tiplady (2010) notes the security issues are the same regardless of the origin of the data, be it paper or digital. For example once paper data is entered into a database, the information in its digital form is subject to the participating hospital's security systems such as firewalls.

The use of touch-screens as a data collection method has been shown to be an efficient method of obtaining information on patient quality of life. (Allenby,

Matthews, Beresford, McLachlan. 2002) Bliven, Kaufman and Spertus conducted a pilot study in 2001 which suggested that health related quality of life data (HRQOI) could be conducted reliably over the web. They noted that "Motivated physicians, hospitals and health plans wanting to integrate HRQOL assessment into patient care find themselves understaffed, with insufficient infrastructure, and without the necessary time or resources to reliably and validly capture patient-centered data". (Bliven, 2001) The use of user friendly interfaces allow patients with minimal computer experience to "successfully communicate through sophisticated data collection networks." (Bliven, 2001) So is there an opportunity for medical professionals and interaction designers to develop simple, reliable and cheap systems for assessing patient quality of life? Falchuk's recent article raises the question of how designers can develop their interface designs so that "designs can be weaved into the daily life of the patient's using safe, familiar, or perhaps invisible means." (Falchuk, 2009) With the rise of 'Cloud Computing'¹ will the collection of health related quality of life data begin to move towards "realising the potential of patient-centred data?" (Bliven, 2001).

The use of the data that's obtained in 'real-time' for use by oncologists and other medical specialists is an exciting and innovative development in the health care system. Velikova, Brown, Smith and Selby (2002) suggest that quality of life data may have a positive effect on doctor-patient interactions by highlighting additional areas for discussion during the consultation. By gathering evidence from patients about their experience of healthcare it may be possible to "insert the patient and their perspectives of health, back into patient care" (Bliven, 2001)

The Frog Healthcare Group discusses the health outcomes and financial implications of evidence-based design (EBD)² when it writes, "With rising healthcare costs and rapid advances in medical devices, wireless communications, and electronic

¹ Wikipedia describes 'Cloud Computing' as " Web-based processing, whereby shared resources, software, and information are provided to computers and other devices (such as smartphones) on demand over the Internet". (Wikipedia, 2010)

² Evidence-based design (EBD) is a design lead strategy that uses reliable data to influence the design process.



medical records, there is a race to not only design new products and services, but to validate them in a clinically meaningful way.” (Pantuso, 2010)

Research in Australia raises some interesting points about the use of touch-pad technology for patient quality of life surveys in an Australasian hospital context. The use of touch-screens as a data collection method has been shown to be an efficient method for obtaining information on patient quality of life. (Allenby, Matthews, Beresford, McLachlan. 2002) As we try to deliver healthcare more effectively it is salient to note Falchuk’s comment that. “If mobile healthcare manages to adopt the right pieces at the right time and in the right way, society will greatly benefit from improved management and delivery of medical care.” (Falchuk, 2009)

The Victorian State Government has recently unveiled a program where 500 iPads will be delivered to a number of hospitals in the state. (LeMay, 2010) In the future it is likely that there will be a varied mix of physical screens, touch pads and ubiquitous computing within the clinical environment as new methods of interacting with familiar technology are developed. This suggests that further research into the use of touch screen graphical interfaces, interaction design for use in healthcare environments and how evidence-based design can inform clinical practices, should be an area of serious investment and research.

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PEER REVIEW

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CONFLICTS OF INTEREST

Nil.