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Evaluating Designs Against Users' Requirements in Latin America: An Experience of Human-Centred Methods, Techniques and Tools on a Low Budget

Analía Baum[a], Alejandro Mauro[a], Damián Borbolla[a], Daniel Luna[a], Fernán González Bernaldo de Quirós[a]

[a] *Department of Medical Informatics, Hospital Italiano de Buenos Aires, Argentina*

Abstract and objective

Informatics designs centered on the human being are multidisciplinary activities which demand a knowledge of the human factors related to human-computer interaction, the ergonomics of the work and of different evaluation techniques. The Medical Informatics Department of the Italian Hospital of Buenos Aires has gradually implemented a full-scale HIS since 199 and is also responsible for periodically evaluating user interfaces. Using qualitative techniques, diverse problems in the problem management interfaces were found and led to multiple modifications in this section of the HER. Using The Questionnaire for User Interaction Satisfaction we evaluate the new interface. The results show that the doctors found the new Problem Administrator easy to use, and there was high overall user satisfaction.

Keywords:
user-computer interface; consumer satisfaction; questionnaires; medical records systems

Introduction

ISO 13407, the standard for human-centred design (HCD) processes for interactive systems, describes human-centred development as "An approach to interactive system development that focuses specifically on making systems usable. It is a multi-disciplinary activity, which incorporates human factors and ergonomics knowledge and techniques. Applying ergonomics to the design of systems involves taking account of human capabilities, skills, limitations and needs."[1]

The Italian Hospital of Buenos Aires is a tertiary care, teaching and research hospital with a 150 year-old history. Since 1998 a full-scale HIS has gradually been implemented. This includes an ambulatory Electronic Health Record (EHR), is a problem-oriented record, Web based, that generalist physicians use in their routine practice to take care of patients[2].

Since 2002, the hospital has had physicians in a residency program in medical informatics. During our daily work, we perceive problems with the utilization of the EHR. Then we make proposals for the improvement of the problem management system. We began with this part of the system because all interaction with the EHR implies the creation of a new problem or the modification of an existing one.

Background

One of the purposes of the HCD process is to establish and maintain a focus on stakeholder and user issues in each part of the organization which deals with system markets, concepts, development and support. To achieve this first stage we conducted a previous study using qualitative techniques based on ethnography[3]. This evaluation allowed us to clarify how information is communicated and used, as well as to identify the causes and consequences of inadequate information flows and to meet users' needs, their tasks, expectations and problems with the information resource.

In the second place we set up a multi-disciplinary team (medical informatics, nurses, sociologist) and developed a plan specifying how to solve the problems seen and to improve the overall system development process[4]. We are now at stage known as "Evaluate designs against requirements". The purpose of this process is to collect feedback from end users on the developing design.

This study was undertaken to measure user interaction satisfaction with the redesigned EHR in routine clinical practice in order to begin to understand which aspects of the system meet the users' requirements and which do not.

Materials and methods

To accomplish the HCD, we focus on Usability testing, in particular on one method; the Questionnaire for User Interaction Satisfaction (QUIS). In addition to the use of the QUIS, one investigator observed and listened to the clinicians during the evaluation of the interface, to answer questions, to document user comments made during data entry and to observe any difficulties met. Five general practitioners participated in the first study[3].

Setting

This study was carried out in a clinician's office. We used mock patient data to ensure that all items of the problem list administration module were included.

Instrument

Version 7.0 of the paper format of the QUIS was used for the study. The QUIS uses Likert scales and a hierarchical approach in which overall usability is divided into 12 sections of 4 to 6 questions each. We used sections from 1 to 8 because sections 9 to 12 were not applicable to the interface[5].

Data analysis

Data from the returned questionnaires were double entered on an Excel spreadsheet. SPSS 11.00 was used for quantitative data analysis.

Results

A total of five general practitioners agree to participate, one woman and four men, ranging in age from 30 to 44, with a mean age of 38.8. Users spend at least 10 hours per day with the EHR for more than 3 years. All were familiar with computer hardware, word processor, database software, e-mail and the Internet. Table 1 shows the mean user response to each section of the QUIS.

Table 1 - Mean user response for each section

Object	Mean	St. Dev.
Overall user reactions	7.5	0.7
Screen Design and layout	7.5	0.8
Terminology and System information	7.6	0.6
Learning	7.2	1.4
System capabilities	7.1	0.8
Online Help	8.2	0.5

Discussion

In this evaluation study, the problem list administration module scored high in all areas. The score for overall user reactions is consistent with the score of the rest of the sections.

The highest score was in "Screen design and layout" and in "Terminology" and the lowest in the areas of "Learning" and "System capabilities". These findings were not too surprising because most of the clinicians' requirements in the first study were met by a terminology server after they had made some suggestions on user interface, that were taken into account when rebuilding the problem list administration module. In addition, based on extensive user feedback, screen designs and quality of terminology had improved significantly.

Interface satisfaction studies have been conducted successfully because we meet users needs on the EHR redesign.

Conclusion

People and organizations used to think that usability testing is very costly and complex and that it should be reserved for the big project with a huge budget and a lavish time schedule. Not true. The best results come from testing no more than five users and running as many small tests as you can afford. This study allowed us to evaluate redesign in the context of users' requirements and to empower users and motivate them.

Future directions

To undertake evaluation studies on the effect or impact of information resources on users, to find out whether these changes increase productivity, enhance the quality of work, and improve health and safety.

References

[1] ISO - International Organization for Standardization. Methods for happy marriages between people and computers. 2002 [cited December 2006]; Available from: http://www.iso.org/iso/en/commcentre/pressreleases/archives/2002/Ref838.html

[2] Gonzalez Bernaldo de Quiros F, Gomez A, Luna D, Martinez M, Soriano E, Staccia G, et al. Migración a plataforma web de una Historia Clínica Electrónica. In: Leão BdF, editor. CBIS'2004 - IX Congresso Brasileiro de Informática em Saúde; 2004; Ribeirão Preto-SP. Brasil; 2004.

[3] Baum A, Luna D, Otero P, Schachner B, Montenegro S, Staccia G, et al. Rediseño de la gestión de la lista de problemas de una historia clínica electrónica utilizando la visión de los usuarios. CBIS'2006 - X Congresso Brasileiro de Informática em Saúde; 2006; Florianópolis - SC. Brasil; 2006.

[4] Lopez Osornio A, Gambarte ML, Otero C, Martinez M, Soriano E, Luna D, et al. Implementación de Servicios Terminológicos en un Sistema de Información Hospitalaria. CBIS'2006 - X Congresso Brasileiro de Informática em Saúde; 2006; Florianópolis - SC. Brasil; 2006.

[5] University of Maryland (UMD). QUIS: The Questionnaire for User Interaction Satisfaction. 2002 [cited December 2002]; Available from: http://www.cs.umd.edu/hcil/quis/

Address for correspondence

Analia Baum M.D.
Department of Medical Informatics
Hospital Italiano de Buenos Aires
e-mail: analia.baum@hospitalitaliano.org.ar