User centered design in health information systems

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Abstract


Complexity in the development and use of health information systems and applications has become more important in the last years due to the grow of the implementation process. Also, particular features in the field, like the high security levels required, the multidisciplinarity in the care process, the several actors in the field and the frequent change of users, make this field more than complex. This situation could benefit if the design and development of health systems adopt user centered design as a partner to resolve some of these problems. Usability, defined as the degree to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use could be the key to reach the optimal systems for healthcare people, but also patients. The objective of this tutorial is to describe and analyze the main criteria and techniques of user-centered (UCD) and its practical application to build health information systems simpler, functional and reach the end user satisfaction. The attendees will receive information to be able to apply criteria for the analysis, design, and evaluation of clinical information systems interfaces.

Keywords: Usability, User Centered Design, Electronic Health Records;

Tutorial Description

Progresses in the use of information and communication technology in the field of health and in particular, the increasing adoption of electronic health records (EHR), have accompanied a growing recognition to the importance of usability in the design of electronic health systems [1, 2]. Usability is defined as "... the degree to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use" (ISO 9241) [3].

The field of health processes is complex and therefore systems and applications used in the field became complex too [3-6]. That is why training and support strategies are highly recommend. However, they fail to be sufficient due to the speed in updating the pieces of software, the multidisciplinarity in the care process, the several actors in the field, as well as the continuous replacement of health professionals attending to an organization.

Likewise, the lack of a design guide that focus in the users as the center leads to an inappropriate use of clinical information systems by health professionals, decreasing the benefits that these technologies promise to provide (greater security to patients, service quality, etc) [7-9].

The ISO standard 9241-210 describes new trends in design and adopt other international standards recommendations [3]. The six main characteristics provides for the UCD in this standard are: design based on an explicit understanding of users, tasks and environments, users are involved in the design and development, the design is targeted and refined by assessments focused on users, the process is iterative, design is aimed at the entire user experience and design team includes multidisciplinary skills and perspectives.

Implement this standard recommendations are not easy. The difficulty and complexity that health field arises in the design of software tools has generated the need for specially trained teams to handle the particular domain [10-12]. While the benefits have been increasingly published in recent times, the execution of studies and description of the working and evaluation methods have not been published in sufficient detail [11, 13].

In this context, the key to the development and acceptance of technology in the field of health, are the design centered in the users and easily of use. Thus, this tutorial offers participants interact with those techniques and methods necessary to implement this concept and develop the knowledge and skills relevant to design simpler systems, focusing on user needs.

Aim of the discussion

The objective of this tutorial is to describe and analyze the main criteria and techniques of user-centered (UCD) and its practical application to build health information systems simpler, functional and reach the end user satisfaction. The attendees will receive information to be able to apply user centered design techniques for the analysis, design, and evaluation of clinical information systems interfaces.

General Organization of the Tutorial

Introduction: General concepts of user-centered design (UCD):

- Human-computer interaction. Definition. Objectives and measures.
- Complexity in the design for healthcare applications.
- Usability and user experience. Definitions

Cycle of user-centered design.

- Background.
- UCD challenges at work.
Principles of user-centered design and evaluation methods for interfaces

- Evaluation methods
- Research in UCD

Design process

- Design rules
- Guidelines, principles and theories
- Development methodologies (Participatory design, Scenario development)

Evaluation of interface design

- Introduction to the evaluation of interface design
- Expert review / Heuristic evaluation
- Usability testing laboratory
- Surveys
- Acceptance tests
- Evaluation during use

Recommendations and experiences using usability techniques in health

- Guides: NIST, HIMSS, etc
- Frameworks: TURF
- Implementations and experiences. Success stories

Future of usability in health

**Expected Attendees**

This tutorial is thinking for physicians, health care workers, data management people, administrative people and all the people related with the design, used, implementation and education of Health Information Systems.

This tutorial can be presented in English and in Spanish

**Tutorial Speakers**

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Chair, Working Group on Health Informatics for Development (WG 09), International Medical Informatics Association (IMIA), USA (2014-2017)

Authors have been working in the topic at Hospital Italiano de Buenos Aires, designing its own developed Health Information System, fully integrated with all the processes in the hospital. They participated in several conferences about this topic and work in many courses related with design and implementation of Health Information Systems. This topic has been publishing for several institutions in all around the world, because of that, we think this could be an interesting topic to present in opportunity of this conference.

This tutorial can be presented in English and in Spanish.

**Expected results**

After the tutorial, attendees will be able to:

- Learn the basic concepts and definitions of UCD
- Describe the different UCD techniques of research, design and evaluation, and their proper application.
- Know the elements and actors involved in the process of UCD.
- Investigate users, contexts and tasks to guide the design.
- Evaluate clinical information interfaces using techniques of Usability.
- Design interfaces for clinical information systems, following guidelines and principles of user-centered design.
- Browse Projects using design methodology centred on the user.

**Bibliography**


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