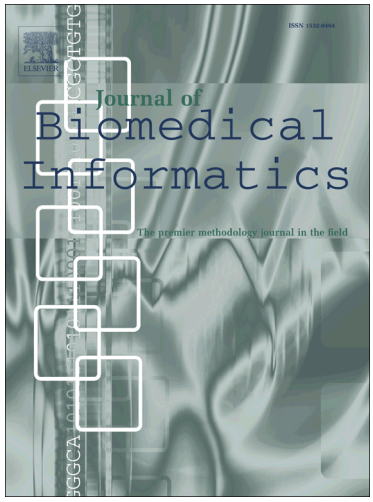

User-Centered Design Improves the Usability of Drug-Drug Interaction Alerts: Experimental Comparison of Interfaces

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User-Centered Design Improves the Usability of Drug-Drug Interaction Alerts: Experimental Comparison of Interfaces

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Abstract. Clinical Decision Support Systems can alert health professionals about drug interactions when they prescribe medications. The Hospital Italiano de Buenos Aires in Argentina developed an electronic health record with drug-drug interaction alerts, using traditional software engineering techniques and requirements. Despite enhancing the drug-drug interaction knowledge database, the alert override rate of this system was very high. We redesigned the alert system using user-centered design (UCD) and participatory design techniques to enhance the drug-drug interaction alert interface. This paper describes the methodology of our UCD. We used crossover method with realistic, clinical vignettes to compare usability of the standard and new software versions in terms of efficiency, effectiveness, and user satisfaction. Our study showed that, compared to the traditional alert system, the UCD alert system was more efficient (alerts faster resolution), more effective (tasks completed with fewer errors), and more satisfying. These results indicate that UCD techniques that follow ISO 9241-210 can generate more usable alerts than traditional design.

Keywords. User-centered design, participatory design, clinical decision support systems, drug interactions, human computer interaction, usability.

1. Introduction

Recent research has highlighted that medical errors are the third leading cause of death in the United States, following heart diseases and cancer [1]. In 1999, the Institute of Medicine reported that almost 25% of total medical errors involved prescription medication [2]. Although most errors are harmless, a few can cause severe

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Abbreviations. EHR: electronic health record; UCD: user-centered design; DDI: drug-drug interactions; HIBA: Hospital Italiano de Buenos Aires; CPOE: computerized physician order entry; HIMSS: Healthcare Information and Management Systems Society; TD: traditional design; PD: participatory design;