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A Preliminary Framework for Usability Analysis in Healthcare

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ABSTRACT

We propose a usability analysis framework for healthcare information technology to help identify potential errors and evaluate their impact on medical processes.

Keywords

Usability, Healthcare Information Systems, Medical Errors

INTRODUCTION

Healthcare organizations are investing in healthcare information technology (HIT) to improve quality and outcomes. However, HIT has also been known to introduce unintended consequences and adverse effects. In order to ensure the safety of HIT, we explore various error classification and analysis schemes proposed in usability and healthcare literature and integrate them into a framework that can help in the analysis of usability data to study potential technology-induced errors.

HIT USABILITY ANALYSIS FRAMEWORK

We integrate results from the past studies in usability problems and medical errors to develop a framework for identifying, classifying and prioritizing technology-induced errors in the healthcare setting. The framework helps analyze usability data by integrating usability and medical error classification schemes along the dimensions of cause, effect, task impact and business impact (Gorlenko and Englefield, 2006) as described below.

Cause

The proposed framework extends the usability problem taxonomy (Keenan et al., 1999), and usability mismatches classification scheme (Zapf, 1992) to classify usability problems. The cause of a technology-induced error can be classified along two dimensions, the artifact characteristics that trigger the error, and the human cognitive actions that contribute to the error.

Effect

In the proposed framework, the effects of the interface defects and cognitive errors are coded using a medical

error framework that details the effects of the HCI errors in clinical terms. The JCAHO framework (Chang et al., 2005), which has been evaluated for validity and reliability is used to document the effect of usability problems on the clinical tasks.

Impact and Outcomes

The third and fourth dimension of the proposed framework analyze the impact of the error and indicates the severity of the adverse effects caused by the error. This severity can be captured using the NCC-MERP classification of outcomes which ranges from no harm, harm, and death (National Coordinating Council for Medication Error Reporting and Prevention, 1998).

FUTURE WORK

In future work we intend to further develop the framework based on a comprehensive analysis of HIT and usability literature, and conduct of usability studies and comparative evaluations to test the utility of the framework.

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