Chapter 19
A Systemic, Participative Design of Decision Support Services for Clinical Research

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ABSTRACT

Development of IT-based services to support decision-making in healthcare should be guided by the following considerations: rigor, relevance, user-centered participation and inclusion of the best practices for IT-based service systems. In this paper, the balance between rigor and relevance is achieved by following the design science research methodology; user-centered participation is tackled from the socio-technical tradition in information systems; best practices considered in the planning, design and implementation of the services are informed by the MOF framework. Moreover, and considering the premise that these pillars should holistically converge, this research has been approached from a systemic stance where iterative, participative, socio-technical activities have allowed the effective collaboration between information systems researchers, clinical researchers, medical staff and administrative hospital personnel. This paper argues for a move towards enhancing systemic, participative, design-centered service systems engineering by reporting a case which applies these concepts for providing decision-support services, enabled by data and text mining techniques, to contribute to clinical research and administration by being able to search electronic health records where narrative text hides meaningful information that would otherwise require a time-consuming human revision of these records.

1. INTRODUCTION

IT in healthcare has had a prominent place within applied information systems research and has a strong tradition, ranging from the very deeply technical and algorithmic – such as classic and modern uses of artificial intelligence and expert systems (Gresh, Rabenhorst, Shabo, & Slavin, 2002; Lisboa, 2002; McCauley & Ala, 1992) – to more socio-technically minded interventions – such as the use of Checkland's Soft Systems Methodology mostly within the context of the UK's NHS (e.g. Kalim, Carson, & Cramp, 2004, 2006). Despite the progress, real impact has not been felt significantly where it matters most. As Hesse and Shneiderman (2007) argue, it has probably been a matter of not asking the right questions: rather than focusing on what technology can do, we should be focusing on what people can do. This follows a general trend in information systems which pays attention to user-centered, participative design (Carroll & Rosson, 2007; Mao, Vredenburg, Smith, & Carey, 2005) as well on situated, context-dependent uses of technology (Orlikowski, 2000). The popularization of many user-oriented information technologies has shown that user experience and involvement in the design, appropriation and evolution of IT exceed consumer electronics and applications and are indeed morally and pragmatically desirable for information systems development in general (McCarthy & Wright, 2004).

This suggests that the development of IT-based services to support decision-making in healthcare should be guided by the following considerations: rigor, relevance, user-centered participation and inclusion of the best practices for IT-based service systems. These requirements are not mutually exclusive but dependent on each other. As such, this paper will present the ongoing development of a set of decision-support services for clinical research, based on a socio-technical, systemic, design-centered approach. The balance between rigor (transparency, validation, formalism, system-atic use of existing knowledge) and relevance (utility, novelty) is achieved by following the design science research methodology (Hevner, March, Park, & Ram, 2004). User-centered participation is tackled from the socio-technical tradition in information systems (Stahl, 2007). Some best practices considered in the planning, design and implementation of the services are informed by the MOF framework (Pultorak, 2008). Moreover, and considering the premise that these pillars should holistically converge, this research has been approached from a systemic stance where iterative, participative, socio-technical activities have allowed the effective collaboration between information systems researchers, clinical researchers, medical staff and administrative hospital personnel.

Through this effort, we have been able to obtain meaningful findings in terms of the technical contribution that data and text mining can have for decision-support in clinical research and hospital administration as well as to explore the integration of participative mechanisms and IT service systems best practices into the growing body of work around development of artifacts through a design science research perspective. In sum, this paper argues for a move towards enhancing systemic, participative, design-centered service systems engineering. It does so by reporting a case which applies these concepts for providing decision-support services, enabled by data and text mining techniques, to contribute to clinical research and administration by being able to search electronic health records where narrative text hides meaningful information that would otherwise require a time-consuming human revision of these records.

One of the main sources for supporting decision-making in hospitals has been the creation and use of electronic health records (EHR), a rich source of data when properly exploited. Nonetheless, in practice, the use of EHR is more complex due in part to the lack of having considered the three pillars of rigor, relevance and user-centeredness.

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