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Designing Multimodal BI&A Systems for Face-to-Face Team Interactions

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ABSTRACT

Organizations increasingly assign complex decision-making tasks to teams. However, current business intelligence & analytics (BI&A) systems are primarily designed to support individual decision-makers and, therefore, cannot be used effectively in face-to-face team interactions. To address this challenge, we conduct a design science research (DSR) project to design a multimodal BI&A system that can be used effectively using a combination of touch and speech interaction. Drawing on the theory of effective use and existing guidelines for multimodal user interfaces, we formulated and instantiated three design principles in an artifact. The results of a focus group evaluation indicate that enhancing the BI&A system with a speech facilitates transparent interaction and increases effective use of the system in team interactions. Our DSR project contributes to the body of design knowledge for multimodal BI&A systems by demonstrating how the combination of touch and speech facilitates its effective use in face-to-face team interactions.

Keywords

Multimodal interaction, business intelligence and analytics, theory of effective use, design science research.

INTRODUCTION

The increasing importance of decision-making in organizations reshapes work practices of employees at any level (Chen, Chiang, & Storey, 2012). To support their employees' data understanding and decision making, most organizations have already implemented business intelligence & analytics (BI&A) systems.

Today, decisions based on BI&A systems are not only made by individuals, but increasingly also by teams. Due to this trend, teams are crucial for organizations in making fast decisions that encompass cross-functional perspectives and backgrounds. Yet, surprisingly few BI&A systems support face-to-face team interactions (Isenberg et al., 2012). Hence, achieving effective use of BI&A systems in face-to-face team interactions remains a challenge.

According to Burton-Jones and Grange (2013), the extent to which a user is accessing a BI&A system unimpededly is a crucial prerequisite to their effective use. One approach to facilitate unimpeded access to BI&A systems in face-to-

face team interactions could be to supplement the current interaction modalities of BI&A systems (i.e., mouse and keyboard or touch) with speech interaction.

However, while there is a large body of design knowledge on multimodal BI&A systems for individual use contexts, multimodal BI&A systems have been predominantly studied from a technology-centric perspective only (Turk, 2014). Thus, there is a lack of knowledge on how to design multimodal BI&A systems for teams. Moreover, it is not well understood whether and how multimodal BI&A systems can facilitate effective use and support decision making in face-to-face team interactions. Hence, we address the following research question:

How to design multimodal BI&A systems for face-to-face team interactions to facilitate the systems' effective use?

To address this question, we conduct a Design Science Research (DSR) project (Kuechler & Vaishnavi, 2008). Drawing on the theory of effective use (Burton-Jones & Grange, 2013) and existing design knowledge for multimodal user interfaces, we designed, implemented, and evaluated a multimodal BI&A system that combines touch and speech interaction. We evaluated our software artifact using a focus group with the finance & accounting department of a large European energy provider.

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