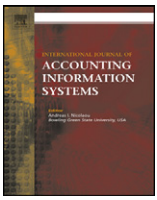
International Journal of Accounting Information Systems xxx (2014) xxx–xxx

Contents lists available at ScienceDirect

International Journal of Accounting Information Systems



The effects of decision aid structural restrictiveness on cognitive load, perceived usefulness, and reuse intentions

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ARTICLE INFO

Article history:
Received 19 February 2013
Received in revised form 18 February 2014
Accepted 23 February 2014
Available online xxxx

Keywords:
Systems restrictiveness
Task technology fit
Technology dominance
Cognitive load
Reuse intention
Systems usefulness

ABSTRACT

As accounting environments become increasingly automated through information technology support systems, the underlying systems are increasingly restrictive in an effort to direct user behavior and decision making. However, consistent with the theory of technology dominance, restrictive systems have been found to dominate users' decision processes and to have a detrimental effect when decisions require knowledge from outside the system's capability. This study expands upon this research through an examination of users' preferences for more (less) restrictive systems based on their own level of domain knowledge. Incorporating theory on task technology fit, we theorize that users with less knowledge will prefer to be dominated by the system, while users with greater levels of knowledge will prefer a system that provides the user with a level of control over the decision process rather than submitting entirely to the decision aid's control. These theorizations are empirically tested through an experimental design that varies the level of systems restrictiveness across groups of novice and experienced participants. The results confirm that novice (experienced) participants find a highly restrictive system substantially (minimally) reduces cognitive load, increases (decreases) usefulness of the decision aid, and strengthens (weakens) the intention to reuse the system in the future. The results add an important piece to understanding the effect of restrictive systems in that the users that are most susceptible to dominance by decision aids are the users most willing to adopt a restrictive system that reduces the effort they must put forth and in turn reduces the knowledge they accrue from using the system.

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http://dx.doi.org/10.1016/j.accinf.2014.02.001
1467-0895/

1. Introduction

Decision aids are widely used across accounting domains (Rose and Wolfe, 2000; Masselli et al., 2002; Dowling and Leech, 2007; Mascha and Smedley, 2007; Bedard et al., 2008). A growing body of literature addresses the prerequisites of a successful adoption of a decision aid, its impact on the decision outcome quality, as well as the potential long term consequences of user reliance (Arnold and Sutton, 1998; Noga and Arnold, 2002; Arnold et al., 2004; Hampton, 2005; Mascha and Smedley, 2007; Dowling and Leech, 2007; Hunton et al., 2010). The Theory of Technology Dominance shows that experienced and novice users respond differently to the recommendations of the decision aid — novice users are more likely to follow the guidance of the aid, while experienced users rely on aids generally only when they match their decision making process (Arnold and Sutton, 1998).

Recently, researchers have begun to focus more on the restrictiveness of decision aids and how they affect users' decision making processes and decision outcomes (Dowling and Leech, 2007; Seow, 2011; Dowling and Leech, forthcoming). The feature of restrictiveness is inherently embedded in a decision aid because the user's decision making process is constrained by the system's functionality (Silver, 1990). Restrictiveness is defined as "the degree to which and the manner in which a decision support system limits its users' decision-making processes to a subset of all possible processes (Silver, 1990, 52)." Restrictiveness is often built into decision aids in order to enforce consistency and completeness of the work being supported. For instance, audit firms have increasingly implemented restrictiveness into their audit support systems to assure consistency and completeness of audit work (Dowling and Leech, 2007; Bedard et al., 2008; Dowling and Leech, forthcoming). Studies show that users often experience less cognitive load when using a decision aid and are therefore more confident in the decisions made when using a more restrictive decision aid (Eining and Dorr, 1991; Bonner et al., 1996; Lowe and Reckers, 2000; Wheeler and Arunachalam, 2008; Hageman, 2010). But as the users submit to the guidance of the decision aid, they fail to think outside the limitations of the decision aids' problem framing or to consider other factors. Less restrictive decision aids can actually encourage the user to think more broadly and better identify the overall problem scope, including aspects of the decision process that may not be captured by the decision aid (Seow, 2011).

Prior research, however, shows that systems restrictiveness can have not only beneficial outcomes in terms of decisional guidance, but these systems also have the potential for deleterious effects on decision processes and decision outcomes (Arnold and Sutton, 1998; Arnold et al., 2004; Seow, 2011). As highlighted by the theory of technology dominance (Arnold and Sutton, 1998), a disadvantage of these systems is that they can narrow the user's focus and cause the user to subsequently lose the power to understand how the problem presented fits into the overall decision domain (Arnold and Sutton, 1998; Asare and Wright, 2004; Bierstaker et al., 2009; Seow, 2011). Further, the users may become overconfident and lose perspective on what they do or do not know. The long term effects of such unwarranted reliance involve potential deskilling of professionals and impairing the further growth of the domain specific knowledge base. The concern here is whether these detrimental consequences from decision aid use by novices are exacerbated by novices preferring restrictive decision aids.

The purpose of this study is to expand upon this prior research's focus on the effects of restrictive decision aids in understanding users' preferences for more or less restrictive decision aids. Framed within a body of research based on the Theory of Technology Dominance (Arnold and Sutton, 1998) which provides evidence that novice users are susceptible to dominance by decision aids and that this dominance can be exacerbated as aids are designed with greater structural restrictiveness, we expand upon this foundation to explore why users might prefer restrictive aids even when less restrictive alternatives exist. We draw upon task–technology-fit theory (Goodhue and Thompson, 1995) to develop a better conceptual understanding of user behavior and preferences when a restrictive or non-restrictive decision aid is made available. The Theory of Technology Dominance posits that novice users have a limited ability to solve a problem without the assistance of a decision aid and will therefore have a high propensity to rely on a decision aid that leads the novice through the problem solving activities. On the other hand, experienced users are expected to be reluctant to rely on an aid unless the aid adapts well to the user's decision making process (Arnold and Sutton, 1998). Thus, the fit of a decision aid parallels this appropriate level of match with the user's experience which is determined in part by the level of restrictiveness in the form of decisional guidance. This level of restrictiveness and fit with the user should lead to greater or lesser cognitive load for the user depending on the user's benefit from increased decisional guidance (Sweller et al., 1998; Paas et al., 2003; Wiebe et al., 2010).

Please cite this article as: Mălăescu I, Sutton SG, The effects of decision aid structural restrictiveness on cognitive load, perceived ..., Int J Account Inf Syst (2014), http://dx.doi.org/10.1016/j.accinf.2014.02.001