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AN EMPIRICAL INVESTIGATION INTO THE MODERATING RELATIONSHIP OF COMPUTER SELF-EFFICACY ON PERFORMANCE IN A COMPUTER-SUPPORTED TASK

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Abstract

Computers and related technologies have become pervasive in the current organizational environment. Most, if not all, organizational activities are dependent on computer-based information systems, and thus effective use of these technologies is a critical factor in reaping productivity gains, improving return on IT investments, and overall organizational performance. While the impacts of computer self-efficacy on computer task-performance are well established (e.g. Johnson and Marakas, 2000; Yi and Davis, 2003) it has not yet been incorporated into the nomological net attempting to explain performance in tasks requiring the use of computer technologies. Given that successful completion of a particular organizational task depends on both technical (e.g. computer-related) and functional (e.g. task-related) abilities (Looney, Valacich, Todd and Morris, 2006), it is important to look beyond performance in computer-only tasks and accordingly position computer self-efficacy as a determinant of performance in a richer task environment. In addition, given that organizational tasks can largely vary on the level of required computer support, it becomes relevant to understand how the effects of computer self-efficacy on task performance fluctuate as the role of the computer becomes more or less prominent.

Introduction

Computers and related technologies have become pervasive in the current organizational environment. Most, if not all, organizational activities are dependent on computer-based information systems, and thus effective use of these technologies is a critical factor in reaping productivity gains, improving return on IT investments, and overall organizational performance (Yi and Im, 2004). The introduction of computer self-efficacy by Gist, Schwoerer and Rosen (1989) and Compeau and Higgins (1995) as a key intervening construct leading to various behaviors related to computer and technology use launched a strong stream of research focused on understanding these effects and different training approaches seeking to manipulate levels of this concept.

While the impacts of computer self-efficacy on computer task-performance are well established (e.g. Johnson and Marakas, 2000; Yi and Davis, 2003) it has not yet been incorporated into the nomological net attempting to explain performance in tasks requiring the use of computer technologies. Given that successful completion of a particular organizational task depends on both technical (e.g. computer-related) and functional (e.g. task-related) abilities (Looney, Valacich, Todd and Morris, 2006), it is important to look beyond performance in computer-only tasks and accordingly position computer self-efficacy as a determinant of performance in a richer task environment. In addition, given that organizational tasks can largely vary on the level of required computer support, it becomes relevant to understand how the effects of computer self-efficacy on task performance fluctuate as the role of the computer becomes more or less prominent. Thus, this dissertation intends to

answer the following two research questions: *(1) What is the relationship between computer self-efficacy and performance in a computer-supported task?*, and *(2) How does that relationship change for different levels of computer-support?*. In order to bound the scope of this work, the focus of this dissertation is on the performance effects of computer self-efficacy. Although certainly interesting and important, other related avenues of research, such as the modeling of computer self-efficacy through training programs, or the effects of the construct on the adoption and use of technology (e.g. Agarwal, Sambamurthy and Stair, 2000) will not be considered in the main model under investigation. The remainder of this document includes a brief review of relevant literature, the development of a research model, and a preliminary description of the proposed methodology, as well as a discussion of the contribution that would result from conducting the proposed research.

Literature Review

Social Cognitive Theory (Bandura, 1997) positions self-efficacy beliefs as key mediators in the relationship between past experience with a task and future behavior and performance, either directly or through their effect on other cognitive and motivational mechanisms, such as coping behavior, task-related effort, and sustaining effort even in light of discouraging feedback (Gist and Mitchell, 1992). Empirical research has demonstrated the important relationship between self-efficacy and performance in a number of work-related tasks, such as training, job search, career development, sales, etc.; for an extensive meta-analysis of these effects, including important moderators, see Stajkovic and Luthans (1998). Self-efficacy has also been extensively researched in academic environments (e.g. Pajares, 1996) and in relation to cognitive therapy and behavior modification treatments (Cervone, 2000).

Within the Information Systems realm, the effects of computer-self efficacy on performance have been extensively studied within the training literature (Compeau and Higgins, 1995; Johnson and Marakas, 2000; Yi and Davis, 2003; Yi and Im, 2004; Johnson, 2005). While very valuable in furthering our understanding of the construct, its antecedents and consequents, and approaches to manipulation, one limitation of this line of research has been its exclusive focus on a narrow measurement of performance, involving only skill tasks manipulating features of a particular software package (e.g. “Enter a formula to compute profits (=sales - expenses) for each season in cells B8:E8”), devoid of any need for extensive understanding of the underlying task.

Research Model and Hypotheses

Improving on this state of affairs, Looney et al (2006) developed a research model that included a task-specific self-efficacy (TSE; investment self-efficacy in this case) as well as computer-self efficacy (CSE), measured at the general level, as antecedents to a (what is termed here) computer-supported task self-efficacy (CSTSE; online investment self-efficacy in Looney et al, 2006), which was in turn an antecedent to outcome expectations from online investing. Although their research did not include a performance variable, and the value of proposing a mediating effect was not well established empirically, that study represents that first attempt to position computer self-efficacy in relation to the larger context of work-related performance, e.g. in a computer-supported task. Whereas Looney et al (2006) argued for the existence of the intervening self-efficacy as a case of generalization of self-efficacy beliefs to different domains (e.g. from investing self-efficacy to online investing self-efficacy), this dissertation proposes that this should be more appropriately considered a case of specificity of measurement. In relation to this issue, Bandura (1997, p. 49) noted that the existence of at least three levels of measurement of efficacy beliefs: for a particular performance under specific circumstances, for a class of performances within the same activity domain, and beliefs in personal efficacy without specifying particular activities or conditions. This dissertation identifies CSTSE as an example of the most specific level, and TSE as conceptualized at an intermediate level. In addition, CSE is shown to moderate this relationship.

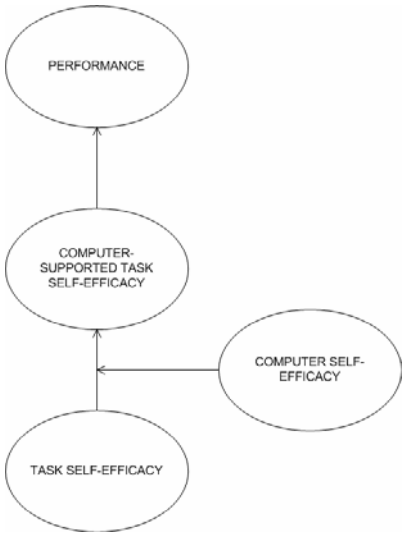

Figure 1. Proposed Research Model

The proposed research model depicted in Figure 1 shows CSE as a moderator, rather than a direct effect, on the relationship between TSE and CSTSE, on the reasoning that, while higher levels of CSE would certainly contribute to enhance the effects of TSE on CSTSE, those alone cannot be sufficient for a high level of CSTSE to be observed. In other words, while high levels of perceived ability to use an application would contribute to one's perception of capability in performing a task using that application, the former cannot substitute for efficacy beliefs in performing the task itself.

Proposed Methodology

Two large-scale studies are anticipated in order to fully answer the research questions posed above. The objective of Study 1 (and associated pilot work) will be to establish the ability to measure CSTSE as a construct separately identifiable from the effects of TSE and CSE. To that extent, a three-cell design, shown in Figure 2, is proposed. Extensive measure development and validation (particularly for TSE and CSTSE) is anticipated in the early portion of Study 1. After adequately refining the framing and measurement of the constructs of interest, a second study will replicate the research model employing a task that varies in the degree of computer support required for successful performance; as part of this study the conceptual development of a continuum of tasks varying in degree of required computer support will be undertaken. It is anticipated that, as the degree of required support increases, the moderating effect of CSE will become stronger, but not affect the underlying structure of the research model.

TSE **CSE**	**CSTSE**	**TSE** **CSE** **CSTSE**

Figure 2. Three-Cell Design for Study 1

Contribution

The expected contribution from carrying forward this dissertation can be summarized in three points. First, the proposed research model represents a theoretically grounded positioning of the computer self-efficacy construct in the larger nomological net of work-related task performance, thus extending the application range of an important research stream. Second, a classification of tasks according to the degree of computer support required for successful performance will be developed and empirically validated. Finally, the work on framing and measurement development required in order to distinguish self-efficacy measures at varying levels of specificity should validate the levels framework proposed by Bandura (1997) and contribute to future work in this area from a methodological standpoint.

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