Investigating the Effects of Distractions and Task Complexity on Knowledge Worker Productivity in the Context of Mobile Computing Environments

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ABSTRACT

Mobile wireless computing is changing the way in which people work, allowing work to occur in a broad range of environments on tasks that previously required fixed location-based, networked computing environments. Along with this greater work flexibility, it is also likely that these mobile work environments contain various types of distractions that could potentially affect the task performance of knowledge workers. Drawing on distraction-conflict theory, this research proposes a model of knowledge worker task performance within the context of a mobile wireless work environment. To test this model, a controlled laboratory experiment was conducted that contrasted task complexity and distraction levels on the task performance of individuals within a mobile wireless environment. Results indicate that regardless of task complexity, productivity losses will occur under both lower and higher levels of distraction. The implications of these results for future research and for the deployment of mobile technologies within organizations are discussed.

Keywords: Mobile Computing, Ubiquitous Computing, Distraction, Task Complexity, Performance, Productivity

INTRODUCTION

Mobile wireless computing is quickly growing in scope and popularity, and holds the promise of being the next major paradigm in personal computing (Barnes, 2001). Given that mobile wireless computing does not limit the personal movement of individuals, this anytime, any-place computing will provide both benefits and challenges (Malladi & Agrawal, 2002;

Philips, 2002). The ability to communicate anytime/anyplace offers new levels of flexibility and convenience (Looney, Jessup, & Valacich, 2004), opening up numerous possibilities within the realm of work. Tasks that have been traditionally undertaken in a fixed setting, such as an office, can now be performed virtually anywhere (Gorlenko & Merrick, 2003), liberating knowledge workers from their cubicle prisons ("Our Nomadic Future," 2008). Similarly, many types of field work can now benefit from any time/any place information accessibility and communications capabilities (Gorlenko & Merrick, 2003; Philips, 2002). It is believed that mobile wireless computing will "foster increased on-the-job productivity and promote the freedom to travel while working or playing" (Philips, 2002, p. 68).

Sherry and Salvador (2001) note, however, that the potential for disruptions to work and concentration can overshadow the productivity and efficiency benefits that mobile work appeared to offer. Additionally, the "always on" capabilities of many mobile devices have the potential to disrupt the work-life balance for many knowledge workers. A review of current literature on mobile wireless computing reveals that little is known about how mobile wireless technologies can be systematically integrated into organizational activities and how this will impact day-to-day processes and overall productivity. This is a particularly vital area of research, however, as more organizations are moving toward a mobile workforce. In fact, iGillottResearch Inc. reported that the US mobile workforce (the firm defines a mobile employee as someone who is out of the office more than 20% of the week but is still working) stood at 56.6 million in 2004 and was expected to rise to more than 61 million by 2009.

Prior research on mobile wireless computing can be classified into three general categories. The first category, which has been the focus of several studies, deals with the acceptance of these new technologies (e.g., Abraham, 2001; Lu, Liu, Yu, & Yao, 2003; Okoli, Ives, Jessup, & Valacich, 2002; Sarker & Wells, 2003; Wakefield & Whitten, 2006). For example,

Okoli *et al.* (2002) describe the challenges that are associated with deploying mobile wireless computing technologies within the realm of professional conferences. Second, the technical design aspects of the technology have been examined (e.g., Boncella, 2002; Lee & Shin, 2005; Shim, Varshney, Dekleva, & Knoerzer, 2002; Viehland & Hughes, 2002). For example, Boncella (2002) provided an overview of how a secure channel can be established in a wireless environment. Third, the implications of mobile commerce or m-commerce have been studied extensively (e.g., Balasubramanian, Peterson, & Jarvenpaa, 2002; Jarvenpaa, Lang, Takeda, & Tuunainen, 2003; Lee, 2005; Stafford & Gillenson, 2003; Urbaczewski, Valacich, & Jessup, 2003). For instance, Jarvenpaa and colleagues (2003) reported that mobile technologies provide not only greater freedoms and connectedness, but also manage the pressure between the two.

In addition to these relatively more established areas, a new stream of research is emerging which focuses on the examination of mobile wireless computing within organizational settings. However, only a few studies were found to investigate such phenomenon (e.g., Beulen & Streng, 2002; Shen & Jones, 2003). For example, Beulen and Streng (2002) reported a field experiment that tested the hypothesis that mobile workers benefit from a specific kind of wireless application protocol (WAP) technology. They found that workers had a positive attitude towards WAP if, when mobile, their working environment was available. Additionally, Shen and Jones (2003) described a field study of knowledge sharing in mobile work settings and examined how rich data capture 'in situ' can be utilized to improve knowledge management practices. This study enhances the understanding of how future mobile multimedia messaging technology can be used in the design of organizational knowledge management systems. Most recently, Chen and Nath (2006) examined the impact of wireless local area networks (WLAN) on organizational users. Survey results revealed that overall "users felt that WLAN improved their quality of

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