International Journal of Information Management 33 (2013) 591–596

Contents lists available at SciVerse ScienceDirect

International Journal of Information Management

journal homepage: www.elsevier.com/locate/ijinfomgt

Case study

Do instant messaging interruptions help or hinder knowledge workers' task performance?

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ARTICLE INFO

Article history:
Available online 23 February 2013

Keywords:
Instant messaging
Interruptions
Internet interruptions
Task performance
Knowledge worker's performance
Experimental case study

ABSTRACT

The modern workplace environment is filled with interruptions due to the necessity of coworkers to communicate with each other. Studies have revealed that interruptions can impact task performance (TP). Communication interruptions are due, in part, to the unavoidable side-effect of using technology to facilitate these interactions. This experimental case study reports about an investigation we conducted on the role of instant messaging interruptions (IMI) and its implications on knowledge workers' TP in a workplace environment. We have gathered data from knowledge workers engaged in an e-learning activity. The case study included a total of 60 experimental observations and analysis of the 120 records revealed that the time to complete a task (TPtct) for certain types of tasks, was significantly affected by IMI. This case study addressed gaps in IM interruption research and practical knowledge about the role of instant messages in the organization. Previous research has been conducted in a laboratory environment with interruptions generated by means other than actual IM. This case study used IMI with participants working in their normal workplace. Findings were used to provide a set of lessons learned recommendations for managers when it comes to the use of IM in the workplace.

1. Introduction

Research indicates that there is a significant problem related to the decrease in knowledge worker task performance (TP) due to interruptions in the workplace (McFarlane, 2002; Rennecker & Godwin, 2005; Trafton, Altmann, Brock, & Mintz, 2003). Previous studies show that interruptions cause a negative impact on the psychological state of a person that consequently causes an increase in the resumption time for a work task (Zijlstra, Roe, Leonora, & Krediet, 1999). According to Cameron and Webster (2005), "while these emerging IM [Instant Messaging] technologies may increase connections, they will also result in increased interruptions to the work of others, with the potential for decreased performance" (p. 98). Interruptions were found to facilitate performance on simple tasks and inhibited performance on more complex tasks (Speier, Valacich, & Vessey, 1999). These results are supported by the distraction-conflict theory (DCT) (Baron, 1986), which states that distractions facilitate performance on simple tasks and inhibit performance on complex tasks. McFarlane and Latorella (2002) asserted that management of interruptions can be mediated by information system user-interface considerations, but the impact to TP is still a viable concern. It was found that an interruption of any duration can increase task completion time, by 3–27%, and as a result there is a greater need for managers to understand the impact of interruptions on TP (Bailey & Konstan, 2006). Thus, it appears that with the pervasive use of computer-mediated communication (CMC) tools in the workplace, such as instant messaging (IM), more experimental case studies are needed (McFarlane & Latorella, 2002; Rennecker & Godwin, 2005). As such, our goal in this case study was to see if instant messaging interruptions (IMI) help or hinder knowledge workers' TP in the workplace.

2. Background

Analysis of the literature on instant messaging interruptions (IMI) in the workplace reveals that some interruptive events are caused by the inherent nature of IM as it opens up a chat session between two or more users to engage in CMC (Cameron & Webster, 2005; Garrett & Danziger, 2008; Huang, Hung, & Yen, 2007). Most workplace environments are full of distractions and interruptions (Rennecker & Godwin, 2005). When coworkers need to communicate or collaborate, IM is often used, which can lead to interruptions (To, Liao, Chiang, Shih, & Chang, 2008). As the use of IM pervades the workplace, the potential that knowledge workers

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http://dx.doi.org/10.1016/j.ijinfomgt.2013.01.011

will be interrupted while working on a task increases (Cameron & Webster, 2005; Tang, 2007).

The impact of an interruption on a task is also based on the complexity of the task being interrupted and the number of interruptions received in a given time (Altmann & Trafton, 2007; Speier et al., 1999; Speier, Vessey, & Valacich, 2003). The impact to TP appears to be primarily in the area of task accuracy (TPacc) and task completion time (TPtct) (Bailey & Konstan, 2006; Speier et al., 2003). TPacc is measured by the error rate in performing a specific task that has right and wrong answers (Bailey, Adamczyk, Chang, & Chilson, 2006; Bailey & Konstan, 2006). TPtct is measured by the length of time required to complete a particular task, minus the time necessary to service the interruption (Simon, 2006; Speier et al., 1999, 2003). TPacc and TPtct comprise two objective measures of TP (McFarlane, 2002).

McFarlane and Latorella (2002) found that most workers are error-prone when exposed to distractions where they have to process large quantities of data or communicate and collaborate with co-workers. However, successful job performance depends, in part, on the collaboration and communication with co-workers. IM impacts this area by providing a means of information sharing between co-workers. If the IM communication benefits both the sender and receiver, then the interruptive nature would only apply to the first IM request. After that, each party would expect additional IM requests until the electronic conversation is concluded, thereby providing benefit to both parties. Speier et al. (2003) stated that "an interruption breaks a decision maker's attention on a primary task and forces the decision maker to turn his or her attention toward the interruption–if only temporary" (p. 773). However, the type of interruption previously used was in the form of another task that the participants would perform, which was devoid of social characteristics. In this case, we used IM as the interrupting media, which contains social interaction with another user.

3. Experimental design

This experimental case study investigated two specific research areas. The first investigated the affect of the interruption itself (IMI) on knowledge workers' task performance (TP) and the second investigated the affect of the *frequency* of the interruptions on the knowledge workers' TP. The two specific areas of this research are depicted in Fig. 1. The first investigated the affect of IMI on knowledge workers' TP for simple and complex knowledge worker tasks. We observed employees engaged in online training tasks, which can be classified as knowledge work that would be conducted in the workplace, such as human resources (HR) training (Davis, 2002). The tasks were classified as symbolic and spatial, which were consistent with tasks from previous research studies (Speier, 2006; Speier et al., 2003). Symbolic tasks consist of the manipulation of discrete sets of symbols, either alpha or numeric, to perform a task. Spatial tasks involve establishing relationships among sets of symbols (Speier et al., 2003; Vessey, 1991).

We then, examined the influence of the *frequency* of the IMI on knowledge workers' TP for simple and complex knowledge worker tasks (Speier et al., 1999). The frequency of the IMI was inherent in the three groups observed, NIMI control group, LIMI group, and HIMI group. TP is a construct and directly assessing it appears to be a great challenge, especially in the context of knowledge tasks (Levy & Ellis, 2006). Therefore, TP was measured using task accuracy (TPacc) and task completion time (TPtct) (Speier et al., 1999, 2003). We investigated the following hypotheses:

H1. For simple-symbolic tasks (TCssym), TPacc will be higher when the task is subjected to increased IMI (No IMI (NIMI), Low IMI (LIMI), High IMI (HIMI)).

H2. For simple-spatial tasks (TCsspa), TPacc will be higher when the task is subjected to increased IMI.

H3. For complex-symbolic tasks (TCcsym), TPacc will be lower when the task is subjected to increased IMI.

H4. For complex-spatial tasks (TCcspa), TPacc will be lower when the task is subjected to increased IMI.

H5. For simple-symbolic tasks (TCssym), TPtct will be shorter when the task is subjected to increased IMI.

H6. For simple-spatial tasks (TCsspa), TPtct will be shorter when the task is subjected to increased IMI.

H7. For complex-symbolic tasks (TCcsym), TPtct will be longer when the task is subjected to increased IMI.

H8. For complex-spatial tasks (TCcspa), TPtct will be longer when the task is subjected to increased IMI.

4. Methodology

According to Yin (1994), case study are best approach when it comes to investigating complex real-life tasks. As such, our investigation was set as a case study and was conducted in one institution,

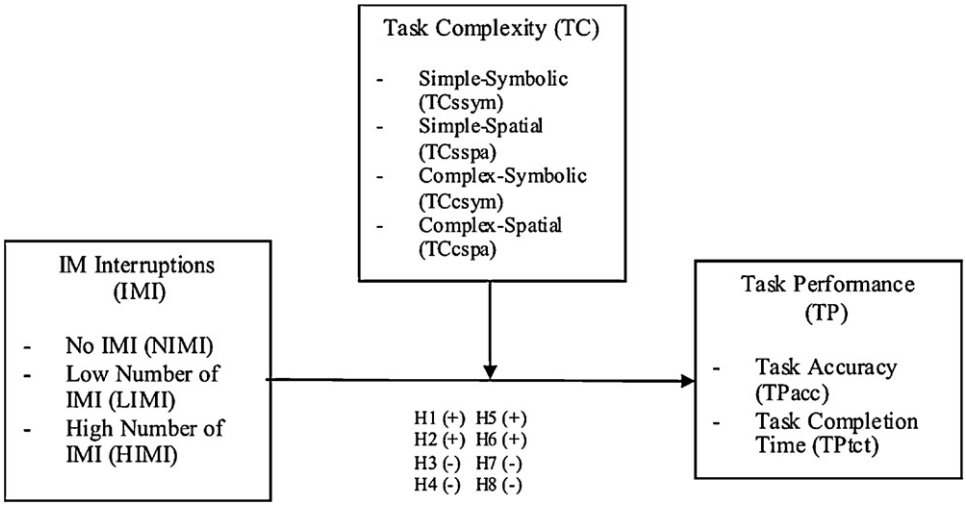

Fig. 1. Model for IM interruptions and their effect on task performance.