

Chapter 1

The Environmental and Technological Factors of Multitasking

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ABSTRACT

Research on multitasking, that is, conducting two or more tasks simultaneously or switching quickly between two or more tasks, has focused mostly on a human's capacity to do so inside their brain. However, our daily life experience indicates that our ability to multitask is not only dependent on our brain capacity, but is also related to other factors such as our environments and available resources. Different individuals may have different abilities to multitask due to their expertise, situational awareness, or ability to plan ahead. This chapter discusses the environmental and technological factors of multitasking based on a prior study. The goal is to expand interdisciplinary dialogues and research methodologies to better understand this prevalent phenomenon in our society.

INTRODUCTION

Multitasking has been around for as long as humans have had competing needs, for instance, doing housework while watching a baby. The demands of post-modern lifestyles and the work force have increased pressure on people to do more things in less time, resulting in more of an impetus to multitask or do several things in the same span of time. Interruptions, which require at least some multitasking to be handled, are commonplace for many jobs including managers, physicians, administrative assistants, and small office workers (Fleishman, Costanza, & Marshall-Mies, 1999). Given its commonality in our daily lives and jobs, not surprisingly, multitasking has attracted interest of basic and applied research.

The rapid development of technologies has continued to raise our expectation to do things faster. For instance, we eat, talk with friends, make phone calls, or do housework while watching TV. When

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we work on a computer, we switch immediately to doing something different if the computer is rebooting or buffering. We have changed our habits of reading, searching, and obtaining information from print media such as books or magazines. Increasingly, we surf the Internet for information, follow the hyperlinks from one link to another, one site to another, and click on the graphics and videos as soon as they call on our attention (Zumbach, 2006). These are just some examples of common multitasking behaviors and activities. We do not wish to waste even one second of our precious time, so we try to do things concurrently or switch quickly from one task to another!

This current chapter focuses on the environmental and technological factors of people's multitasking behaviors, with the goal to expand interdisciplinary dialogue and research methodologies to better understand this prevalent phenomenon in our society. The chapter will begin by providing an overview of relevant research on multitasking to date. It will then discuss the environmental and technological factors that affect individuals' multitasking behaviors based on themes from a qualitative study. The chapter will conclude by suggesting implications and future research directions.

LITERATURE ON MULTITASKING

In this section, we will provide an overview of research on multitasking through the following lens: 1) limited brain capacity for multitasking; 2) partial attention or rapid switch; 3) cognitive load, automation, and expertise; 4) cultural perceptions of time and individual differences; 5) technological changes; and 6) the perceived new skills, needs and demands.

Limited Brain Capacity for Multitasking

Multitasking has been defined as doing several things at the same time, or as switching quickly between several different tasks (Baddeley, 1996; Meyer & Kieras, 1997). Depending on variations of beliefs in multitasking attitudes and behaviors in different disciplines, different terms have been used to describe and research this phenomenon, including, for example, *dual task*, *task switching*, *multitasking*, and *polychronicity* (Baddeley, 1996; Bluedorn, 2002; Hall, 1959; Meyer & Kieras, 1997; Monsell, 2003; Spink & Park, 2005).

Most studies in cognition, psychology, information science, and neuroscience have shown that our ability to engage in concurrent tasks is rather limited (Baddeley, 1996; Broadbent, 1958; Fisch, 2000; Just et al., 2001; Lang, 2001; Spink & Park, 2005). Research shows that multitasking over different types of tasks reduces productivity (Just et al., 2001; Rubinstein, Meyer & Evans, 2001), and that our ability to perform concurrent mental operations is limited by the capacity of the brain's central mechanism (Schweickert & Boggs, 1984). Wickens' Multiple Resource Theory Model (1984) proposed that humans have limited capability in processing information, although several different pools of resources rather than one single source can be tapped. This is because cognitive resources are limited in a finite amount of time and a supply and demand problem may occur when an individual performs two or more tasks that require the same resource in the same time interval.

Both theoretical and empirical studies show that our prefrontal lobes control the executive functions of our brain. Generalized functions include: 1) working memory, 2) self-regulation, 3) internalization of speech, and 4) reconstitution (behavior analysis and synthesis) (Barkley, 1997). According to Barkley (1997), improper development of the self-regulation function is one of the possible causes of Attention

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