



Laptop multitasking hinders classroom learning for both users and nearby peers

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ARTICLE INFO

Article history:

Received 11 September 2012

Received in revised form

5 October 2012

Accepted 12 October 2012

Keywords:

Laptops

Multitasking

Attentional control

Pedagogy

ABSTRACT

Laptops are commonplace in university classrooms. In light of cognitive psychology theory on costs associated with multitasking, we examined the effects of in-class laptop use on student learning in a simulated classroom. We found that participants who multitasked on a laptop during a lecture scored lower on a test compared to those who did not multitask, and participants who were in direct view of a multitasking peer scored lower on a test compared to those who were not. The results demonstrate that multitasking on a laptop poses a significant distraction to both users and fellow students and can be detrimental to comprehension of lecture content.

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1. Introduction

Multitasking is ingrained in our daily lives. As you read this article, you may also be attending to a text message, sipping coffee, or writing out a list of to-dos. Such a lifestyle is intended to increase efficiency; however, there are limitations to how well multiple tasks can be carried out concurrently (Posner, 1982). Multitasking places considerable demands on cognitive resources, which, in turn, degrades overall performance, as well as performance on each task in isolation (Broadbent, 1958). The issue of multitasking and its consequences has become a growing concern in education, as students are more commonly found engaged with their laptops or smartphones during class time. The current study investigated the effect of laptop multitasking on both users and nearby peers in a classroom setting.

There is a host of theoretical and experimental research on divided attention and dual-task interference, terms that we consider homologous to multitasking and therefore relevant to the current discussion. Research suggests that we have limited resources available to attend to, process, encode, and store information for later retrieval (Posner, 1982). When focused on a single primary task, our attentional resources are well directed and uninterrupted, and information is adequately processed, encoded, and stored (Naveh-Benjamin, Craik, Perretta, & Tonev, 2000). When we add a secondary task, attention must be divided, and processing of incoming information becomes fragmented. As a result, encoding is disrupted, and this reduces the quantity and quality of information that is stored (Pashler, 1994). When we eventually retrieve information that was processed without interruptions, as a primary task, we are likely to experience minimal errors. When we retrieve information that was processed via multitasking or with significant interruptions from a secondary task, we are more likely to experience some form of performance decrement (Wickens & Hollands, 2000).

Indeed, managing two or more tasks at one time requires a great deal of attention. Attentional resources are not infinite (Konig, Buhner, & Murling, 2005; Pashler, 1994). When the level of available attentional resources is less than what is required to complete two simultaneous tasks, performance decrements are experienced since both tasks are competing for the same limited resources. This is especially true if both tasks are competing for resources within the same sensory modality (Navon & Gopher, 1979; Wickens, 2002; Wickens & Hollands, 2000). Limits to attentional resources means the quality (accuracy) and efficiency (reaction time) at which multiple tasks are processed will be compromised (Rubinstein, Meyer, & Evans, 2001). Numerous experimental studies have shown performance decrements under conditions of multitasking or divided attention (e.g., Broadbent, 1958; Tulving & Thomson, 1973).

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