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Multitasking during Web search sessions

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Abstract

A user's single session with a Web search engine or information retrieval (IR) system may consist of seeking information on single or multiple topics, and switch between tasks or multitasking information behavior. Most Web search sessions consist of two queries of approximately two words. However, some Web search sessions consist of three or more queries. We present findings from two studies. First, a study of two-query search sessions on the AltaVista Web search engine, and second, a study of three or more query search sessions on the AltaVista Web search engine. We examine the degree of multitasking search and information task switching during these two sets of AltaVista Web search sessions. A sample of two-query and three or more query sessions were filtered from AltaVista transaction logs from 2002 and qualitatively analyzed. Sessions ranged in duration from less than a minute to a few hours. Findings include: (1) 81% of two-query sessions included multiple topics, (2) 91.3% of three or more query sessions included multiple topics, (3) there are a broad variety of topics in multitasking search sessions, and (4) three or more query sessions sometimes contained frequent topic changes. Multitasking is found to be a growing element in Web searching. This paper proposes an approach to interactive information retrieval (IR) contextually within a multitasking framework. The implications of our findings for Web design and further research are discussed.

1. Introduction

Due to the increasing complexity of the global information environment people are increasing engaged in multitasking and information task switching behaviors. Multitasking is the ability of humans to

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simultaneously handle the demands of multiple tasks through task switching (Just et al., 2001; Rubinstein, Meyer, & Evans, 2001). Multitasking continues to be an important research area for technologies designers in general. However, many interactive technologies do not provide effective support for managing multitasking behaviors (Wickens, 1992).

Wickens (1992) suggests that *time sharing* allows the simultaneous performance of multiple tasks and time swapping allows the sequential performance of tasks. Multitasking is a critical human behavior that allows people to cope with ever more complex environments by handling multiple tasks through task switching (Burgess, 2000; Carlson & Sohn, 2000; Lee & Taatgen, 2002). Web search can also include information multitasking behaviors that occur when users juggle the challenge of searching on multiple topics.

Web search engine users may information multitask in two ways. First, a user may begin their Web search with multiple topics, or second begin with a single topic and then develop additional topics during the search process. Both processes include information task switching, or switching back and forth between different topics during a search session. For example, a user may switch between seeking health information and new car information as they think and work on multiple information problems concurrently.

Currently, search technologies necessitate that users search sequentially and are designed to largely support only limited types of searching by specifying queries using terms to select documents or Web sites to fulfill a single information task. However, people in fact accomplish searching in much more complex ways than just this method of query specification and selection.

This paper first provides an overview of the research into general multitasking behavior, then multitasking information behavior and information task switching. The paper then details the research goals, research design and results from a study of multitasking on the AltaVista Web search engine.

2. Related studies

2.1. Multitasking behavior

Cognitive psychologists have studied many aspects of multitasking or task switching (Carlson & Sohn, 2000; Miyata & Norman, 1986). Rubenstein et al. (2001) found that multitasking between different types of tasks can reduce productivity. Recent studies suggest that users' searches may have multiple goals or topics and occur within the broader context of their information-seeking behaviors (Miwa, 2001). Research studies also indicate that users' searches may have multiple goals or topics and occur within the broader context of their information-seeking behaviors (Spink, 2004; Spink, Jansen, Wolfram, & Saracevic, 2002).

2.2. Multitasking information behavior

A growing body of studies shows that people often have many tasks (or information problems/topics) at hand at the same time. In these cases, a person may pool their topics together and interact with the Web on more than one related or unrelated topics. Overall, a user's single session with a Web search engine or a library may consist of seeking information on single or multiple topics, and also switching among topics (Spink et al., 2002). In 1999, Spink, Bateman, and Greisdorf (1999) found that 11 (3.8%) of the 287 Excite users responding to a Web-based survey reported multitasking searches. Spink et al. (2002) show that IR searches often include multiple topics, during a single search session or *multitasking search*. They found that multitasking information seeking and searching is a common human behavior as many IR system users conduct information seeking and searching on related or unrelated topics. In addition, Web or IR multitasking search sessions are longer than single topic sessions with mean topics per Web search ranging from 1 to more than 10 topics and a mean of 2.11 topic changes per search session.