Multitasking, Cognitive Coordination and Cognitive Shifts during Web Searching

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Enlightened by the cognitive psychology literature demonstrating that multitasking behavior is correlated closely to humans' cognitive processing and coordination capabilities, this doctoral thesis explores the nature and relationship of multitasking, cognitive coordination, and cognitive shifts during Web searching. A combination of data collection techniques including pre- and post-questionnaires, think-aloud protocols, search logs, observations and semi-structured interviews were employed to observe how 42 postgraduate students cognitively coordinated Web searches when multitasking across 126 real-life information problems.

Results show that Web searching is a dynamic interaction between users and Web search systems during which multiple information problems ordering, evolving information problems generating, searching task switching, task and mental coordinating occur, and at a deeper level, cognitive shifts take place. The explicit task level coordination is closely linked to multitasking behavior. The implicit cognitive level coordination is related to the task coordination process; this includes the evolution of information problem development and search task switching. Coordination mechanisms directly result in the shifts of cognitive states including strategy, evaluation, and view states which further affect users' holistic shifts in information problem understanding and knowledge contribution.

Based on the findings, a Web search model integrating multitasking, cognitive coordination and cognitive shifts (MCC model) is presented. Cognitive coordination as humans' vital capability under conscious control plays a nexus role in supporting multitasking Web searches and invoking the occurrence of shifts in cognition. The results extend multitasking research and Web search models in the field by examining and integrating underlying cognitive and coordination support mechanisms. Design recommendations for adaptive search systems are also put forward based on the characteristics and relationship of users' behaviors in multitasking, cognitive coordination and shifting.