Multitasking and Interruptions: a SIG on Bridging the Gap between Research on the Micro and Macro Worlds

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Abstract
Within the CHI community there has been sustained interest in interruptions and multitasking behaviour. Research in the area falls into two broad categories: the micro world of perception and cognition; and the macro world of organisations, systems and long-term planning. Although both kinds of research have generated insights into behaviour, the data generated by the two kinds of research have been effectively incommensurable. Designing safer and more efficient interactions in interrupted and multitasking environments requires that researchers in the area attempt to bridge the gap between these worlds. This SIG aims to stimulate discussion of the tools and methods we need as a community in order to further our understanding of interruptions and multitasking.

Keywords
Interruptions; Multitasking; Methodology

ACM Classification Keywords
H.5.2 [Information Interfaces And Presentation]: User Interfaces – Evaluation/methodology;
Introduction

Interruptions and multitasking (IM) have been part of the CHI community’s discourse from its very first proceedings (see [8]). In recent years the volume of IM papers appearing in CHI proceedings has been high: at CHI’11 there were 7 papers mentioning multitasking or interruption in their title.

The methods used in IM investigations have been satisfyingly broad. Some parts of the community have focused on experimental studies of performance in IM settings (e.g. [1,2,3,4,12,14]) while others have looked at IM in situated settings using both quantitative (e.g. [6]) and qualitative techniques (e.g. [7,10]). Despite this heterogeneity in approaches, cross-citations between the community’s publications are common. This suggests an acknowledgement of the need to understand interruptions and multitasking through the whole spectrum of behaviour, from theories of human memory to organisational practice.

Despite the efforts of researchers to represent multiple perspectives in their research motivations, there still seem to be two distinct worlds of IM research: micro and macro. The micro world is generally characterised by simple single-user interactions and measurements in milliseconds. In contrast, the macro world often involves multiple actors and technologies, not all of which are computer based. If time is measured in the macro world, it is usually in minutes. Of course, both kinds of study are designed to answer different kinds of questions. The aim of this SIG is not to contrast these methodologies. Rather, it is to identify situations in which data from both worlds can be collected simultaneously and with little additional cost in terms of time or effort.

Imagine a study that aims to evaluate the situated use of a new system in an IM environment. For this study we might be especially interested in macro world features of performance. For example, a well-designed system might seek to minimise productivity loss through disruption. In the micro world, resumption lag is used as a measure of how disruptive an interruption is. If the cost of collecting data at both levels of granularity has little cost, we should try to do so. It will either provide validation for existing results, present a new problem to solve, or illustrate the complexity that we often do our best to minimise.

If we find that the micro and macro worlds are truly incommensurable then the community faces a serious challenge to current theories of IM, which tend to assume a continuum between the two worlds (e.g. [13]). Given the community’s goal is (for the most part) to improve interaction with technologies in interrupted and multitasking environments, we should all have a vested interest in coherence between the artefacts of performance in the two worlds. Behaviour monitoring systems have already been developed with the purpose of improving user experience of interrupted systems [9]. Can we extend these sorts of frameworks to the larger community?

Organisers and Audience

The workshop is organised by Sandy Gould (a research student investigating interruptions), Duncan Brumby, Anna Cox, Víctor González, Dario Salvucci and Niels Taatgen (who between them have: experience as members of CHI program committees; extensive publication histories in IM; and previous experience of organising workshops).
The primary audience for this SIG is the active IM community that already exists at CHI. The organizers of this SIG have already solicited expressions of interest from members of the IM community, notably: Steve Brewster, Mike Byrne, Mary Czerwinski, Laura Dabbish, Anthony Hornof, Eric Horvitz, Chris Janssen, David Kirsh, Gloria Mark, Aga Szostek, Greg Trafton and Steve Voida. We believe that this will provide a solid foundation for a successful SIG meeting and we would also encourage other researchers interested in the relationship between IM and their research to attend.

**Schedule**

Given the nature of the session and in anticipation of lively discussion, we intend to run the SIG with a light touch. There will be a five-minute introductory talk by the SIG organisers to reiterate the SIG’s goals and topics, followed by a five-minute session for participants to introduce themselves. There will be three five-minute presentations made by leaders in the area on how they think we can go about bridging the gap. These introductory talks will frame the subsequent sessions. We will then move into a scenario-driven session. The scenarios will be discussed in the context of the topics listed below. The scenarios will cover as full a range of situations as possible: from hospital wards to computer-based collaborative environments. Discussion of these scenarios and any ad-hoc discussions will make up the rest of the session.

**Suggested topics for discussion**

**User-centred measures** - Switch frequency, interruption lags, and time-on-task are often used as measures in IM studies. These measures provide a good proxy for how disruptive interruptions are in the micro world. But do they correspond to participants’ subjective experience of IM? Diary studies [5] have can provide insight into subjective experience, but they miss the millisecond interactions that occur when moving between tasks. Might the simultaneous collection of subjective and objective measures of disruption improve confidence in our findings?

**Long-term studies of micro world interactions** – A unit of work in the micro world is usually timed in minutes. What techniques can we use to extend the study of micro-world phenomena into the longer-term? What kind of knowledge might such approaches generate and is sacrificing a purely experimental design an inevitable consequence of using such methods?

**Real-time data collection** – Most accounts of IM phenomena are retrospective. There have been attempts to create real-time systems that adapt to the user and current environmental conditions for notifications [9] and just-in-time systems using eye-tracking [11]. To what extent can more exotic techniques like brain-computer interfaces help us reveal more about IM behaviour?

**Ethics** - How do we resolve ethical conflicts that could arise in the course of collecting increasingly fine-grained data in real world situations? Discreet ways of collecting data about people’s behaviour comes with a corresponding duty to ensure that participants know what data is being collected about them and when it is being collected.

**Conclusion**

This is an active community in which attempts are being made to synthesise findings from multiple methodologies into a coherent account of interaction...
with technologies in IM environments. This SIG will provide an opportunity to explore how we can do an even better job of bridging the gap between different types of methods and measures in IM research. If it is successful, we hope that it might provide the impetus for a larger IM event in the future.

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References