mobileSJ: 
Managing Multiple Activities in Mobile 
Collaborative Working Environments

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ABSTRACT

Many modern working environments are characterized by the need to manage multiple activities simultaneously. This is the case of hospital work, which also demands a high degree of mobility and collaboration among specialists. These working conditions have motivated us to design and implement mobileSJ, a mobile information management tool based on the concept of working spheres. The tool allows users to gather information related to a working sphere, including documents, contacts, and pending tasks. The tool assists users when switching between tasks, facilitates the sharing of activity related information with colleagues, as well as the synchronization of information among multiple devices, including handheld computers and public displays. We conducted a usability test and a focus group to inform the design of a new version of the tool and to know how the tool could support the work of medical interns by facilitating the management and sharing of resources, providing more efficient means of communication with colleagues and increasing their personal productivity.

Keywords: file management systems; human-machine systems; mobile technologies; systems evaluation

INTRODUCTION

Modern work environments require professionals to constantly switch among different activities. Within the context of office work, previous studies have shown that the engagement in each activity can be rather brief, averaging just a few minutes (Czerwinski, Horvitz, & Wilhite, 2004; Gonzalez & Mark, 2004). Professionals can switch between different activities because they are interrupted (unexpected visit, a call phone, etc.) or because, by their own initiative, they decide to focus on another task. Studies have shown that people interrupt themselves as much as they are externally interrupted (Sproull, 1984) and that immediate resumption of an interrupted activity is not always likely to happen, occurring
just two-thirds of the time (Gonzalez & Mark, 2004). Commonly the transition between activities is not simple because it requires important context switching, not just of mental states but also switching at the level of retrieving physical or digital representations of resources. In order to preserve the status of an activity and facilitate context retrieval, people often organize their workspaces or seed “marks” on it (Kirsh, 2001; Malone, 1983; Rouncefield, Hughes, Rodden, & Viller, 1994). For instance, it has been noticed that many professional have clutter over their desks and usually they are disrupted by changes made to this apparent “muddle”, because this apparent clutter includes landmarks of the actions and activities that they need to do (Kidd, 1994). Furthermore, organizing workspaces can be complex when multiple activities are managed simultaneously, and when multiple resources are associated to each activity. This is because performing an activity usually implies the use of a diversity of information resources such as documents, notes, agendas, calendars, or diagrams. Consequently, the need to remember the location and gather all the information resources related to an activity is likely to involve certain effort and sometimes results on cognitive overload for the user, which can be even more challenging in the digital realm, as current computer operating systems make the invocation of such resources a complex and time consuming task (Kaptelinin, 2003; Voida, Mynatt, MacIntyre, & Corso, 2002).

Although handling resources and managing multiple activities can be problematic for many types of information work contexts, a particularly challenging context is the one experienced by medical workers. Hospitals are dynamic and intensive work environments where people have multiple activities and responsibilities, and cope with frequent contingencies that require them to constantly adjust and readjust their actions (Bardram & Bossen, 2003). In addition, hospital workers are highly mobile and experience a high degree of collaboration and coordination with colleagues. The activities of most hospital workers clearly are not tied to a desktop or a specific location because they need to move to locate colleagues, take care of patients, and access information and other resources distributed in space (Bardram & Bossen, 2003; Muñoz, Rodriguez, Favela, Gonzalez, & Martinez-Garcia, 2003). This phenomenon identified as local mobility (Belloti & Bly, 1996) requires the user to change “workplace” constantly and even suddenly. Besides, the specialized nature of medical work makes the treatment and care of patients an inherently collaborative effort among specialized medical workers who have to be in constant communication with each other to be able to perform their activities.

In this article, we describe the design of an application to support mobile workers in managing their multiple activities and collaborations. Based on the concept of working sphere proposed by Gonzalez and Mark (2005), we defined an application to support medical interns while carrying out their activities. The rest of this article is organized in the following way. In the second section, we briefly explain our approach to the concept of working sphere and its instantiation in the application named “Sphere Juggler”, which served as the basis for the tool mobileSJ presented here. In the third section, we discuss mobile worker’s need to manage multiple activities by focusing on the work of a particular kind of medical workers: medical interns. In the fourth section, we describe the application mobileSJ, its functionality, and architecture. The fifth section presents the results of a usability test and a focus group conducted with potential users, as well as a discussion of the findings. Finally, in the last section, we present conclusions and directions for future work.

WORKING SPHERES
The concept of “working spheres” (Gonzalez & Mark, 2004) was introduced as a proposal to conceive the way in which people organize and execute their work activities. A working sphere has been defined as “a set of interrelated tasks, which share a common motive, involve the interaction with a particular constellation of people, use ensembles of resources and have their own individual time framework” (Gonzalez & Mark,

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