

Towards ubiquitous task management

Author: Christina Yum, christina.e.yum@gmail.com

Supervisor: Professor Judy Kay

School of Information Technologies



You rush from the office after some last minute changes to meet that Friday deadline.
 You jump in the car, pushing aside Wednesday's (or was it Tuesday's?) to-do list on the front seat.
 Relieved at your progress since then, you remember to fill up the tank before that orange light starts flashing.
 You're home, and let out a sigh of relief as the week is finally at an end.
 "I'm home! Something smells good."
 "Dinner will be ready soon, did you remember the milk?"

1. Introduction

Between our personal and work lives, we are required to divide our attention between numerous demands and responsibilities. People use a number of strategies in an attempt to manage what they need to do, over both physical and digital workspaces. To-do lists, post-it notes, emails, alarms, computer-based calendars and/or paper diaries play a major role in the task management strategies of many individuals. We are at a point in time where this is evolving. As computing moves into the cloud and smartphones become more powerful, many people have transitioned towards computer-based solutions. There is great potential for task management tools to improve the productivity of individuals and the co-ordination of teams, or even families. Previous research has shown that such tools are often abandoned (Blandford and Green, 2001) and key research efforts (such as Bellotti et al, 2003, 2004, Whittaker, 2005 and Myers, 2007) have focused on developing task management tools, rather than understanding how these are used in practice.

4. Results of Field Study

The study provided a rich corpus of qualitative data. We analysed this in two ways. First, we conducted a grounded analysis. Then we conducted an analysis driven by the taxonomy elements.

- Strong trends emerged from **both** groups for the importance of mobile access to task management tools. It was particularly notable that the desktop-only group identified this need.
- Participants in the mobile+desktop group used the task manager more and found it more effective overall than the pure desktop group. 6 out of 9 in this group used the application exclusively on their mobile device, and added an average of 45 tasks over the four weeks compared to an average of 21 in the desktop group.
- Mobile devices were heavily used for a broad range of task management functions, beyond just viewing tasks. This contradicts previous findings (Radi et al., 2008). Mobile+Desktop participants use the tool extensively for diverse tasks: reminding, structuring, making decisions, storing information and maintaining perspective.

Analysis based on the taxonomy points to the importance of mobile use for *task capture*. *Planning and reflection* was promoted in the mobile version, while *coordination* was achieved primarily from the desktop. The *organisation and retrieval* function was also not heavily utilised on the mobile application. The need for *integration* with calendars and email for both versions of the application was a strong trend across all participants.

2. Taxonomy

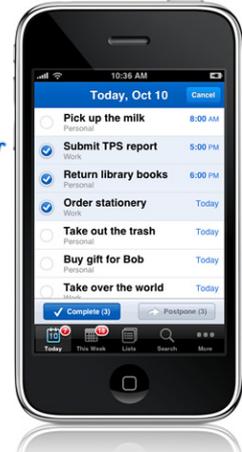
There is a diverse variety of existing task managers and a large body of diverse research exploring new approaches to task management. To provide a basis for improved understanding of these, the project developed a taxonomy of Ubiquitous Task Management (UTM), based on a comprehensive study of the literature and deployed systems. The taxonomy elements are shown in the left of the table below. The remaining columns show the characteristics of key approaches described and studied in the literature. The taxonomy both describes each approach systematically and shows significant trends, such as the degree of automation in red. It shows an important pattern in relation to integration and availability, indicating part of the well-documented success of email as a task manager. It also shows that many of the other approaches perform poorly.

	Pen & paper	Pure email	Taskmaster (Bellotti et al., 2003)	Towel (Myers et al., 2007)	Trac	Remember The Milk
Task capture						
Task name	✓	✓	✓	✓	✓	✓
Priority	✓	✓	✓	✓	✓	✓
Due date	✓	✓	✓	✓	✓	✓
Time estimate	✓	✓	✓	✓	✓	✓
Task repetition	✓	✓	✓	✓	✓	✓
Planning and reflection						
Overview	✓	✓	✓	✓	✓	✓
Progress	✓	✓	✓	✓	✓	✓
Postpone	✓	✓	✓	✓	✓	✓
Complete	✓	✓	✓	✓	✓	✓
Archive	✓	✓	✓	✓	✓	✓
Organisation and retrieval						
Classification structure	✓	✓	✓	✓	✓	✓
Tags	✓	✓	✓	✓	✓	✓
Contexts	✓	✓	✓	✓	✓	✓
Search	✓	✓	✓	✓	✓	✓
Coordination						
Task-specific contacts	✓	✓	✓	✓	✓	✓
Share lists	✓	✓	✓	✓	✓	✓
Share individual tasks	✓	✓	✓	✓	✓	✓
Delegate tasks	✓	✓	✓	✓	✓	✓
Integration						
Email	✓	✓	✓	✓	✓	✓
Calendar	✓	✓	✓	✓	✓	✓
URLs	✓	✓	✓	✓	✓	✓
File system	✓	✓	✓	✓	✓	✓
Other applications	✓	✓	✓	✓	✓	✓
Availability						
Desktop	✓	✓	✓	✓	✓	✓
Web	✓	✓	✓	✓	✓	✓
Service	✓	✓	✓	✓	✓	✓
Private storage	✓	✓	✓	✓	✓	✓
Mobile	✓	✓	✓	✓	✓	✓
Single display groupware	✓	✓	✓	✓	✓	✓

Key: ✓ = Supported; ✓✓ = Partially Automated; ✓✓✓ = Fully automated;

3. Field Study

We designed a field study to gain understanding of the ways that mobile technology affects the ways that people can manage tasks, an important emerging issue that has not been reported in the literature. We selected a state-of-the-art tool, Remember The Milk, for use on the iPhone.



19 participants were involved representing a diverse population, in terms of technology use, age (20s to 50s) and educational background backgrounds.

2 groups were recruited for the study. One using only the desktop application, the other using both the mobile and desktop.

4 weeks duration, with weekly online surveys, automated counting of tool use, and an exit questionnaire and interview

5. Contributions

- Analysis of task management literature to inform the design of a UTM taxonomy
- Used the taxonomy to highlight Integration and Availability as opportunity areas for future work
- Conducted a 4-week field study to gain understanding of task management on a mobile device and across multiple devices.

6. References

- Victoria Bellotti, Brinda Dalal, Nathaniel Good, Peter Flynn, Daniel G. Bobrow, and Nicolas Ducheneaut. What a to-do: studies of task management towards the design of a personal task list manager. In CHI '04, New York, USA, 2004. ACM.
- Victoria Bellotti, Nicolas Ducheneaut, Mark Howard, and Ian Smith.. Taking email to task: the design and evaluation of a task management centered email tool. In CHI '03, New York, NY, USA, 2003.
- Ann Blandford, Thomas Green. Group and individual time management tools: What you get is not what you need. Personal Ubiquitous Computing, 5(4):213–230, 2001.
- Karen Myers, P. Berry, J. Blythe, K. Conley, M. Gervasio, D. McGuinness, D. Morley, A. Pfeffer, M. Pollack and M. Tambe. An intelligent personal assistant for task and time management. AI magazine, 28(2):47–61, Summer 2007.
- Harald Radi and Rene Mayrhofer. Towards alternative user interfaces for capturing and managing tasks with mobile devices. In MoMM '08: Proceedings of the 6th International Conference on Advances in Mobile Computing and Multimedia, pages 272–275, New York, NY, USA, 2008. ACM.
- Steve Whittaker. Supporting collaborative task management in e-mail. Human-Computer Interaction, 20(1-2):49–88, 2005.

