

ENCOURAGING A CULTURE CHANGE IN TASK MANAGEMENT WITHIN PIM TOOLS

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Abstract: Personal Information Management (PIM) software tools are becoming increasingly important in easing the high information workloads of today's knowledge workers. However despite the efforts of both commercial vendors and research teams, significant improvements have yet to find their way into mainstream commercial tools and common usage. This paper focusses on two particular aspects: improved support for task management and better user interface metaphors. We also address the issue of how current knowledge work culture affects the way in which PIM tools are utilised, and of adoption of these tools.

1 INTRODUCTION

There continues to be pressure on knowledge workers, especially since the recent global financial crisis, to achieve more and more in less time and with fewer resources. This situation has been exacerbated by increasing administrative controls and tighter competition for business. IT assistance seems to have hit a road block; users are still using much the same everyday tools for Personal Information Management (PIM) as they were a decade ago.

This paper looks at possible ways round this road block from two angles: firstly though suggested improvements to today's PIM tools in the areas of task management and user interfaces; and secondly through addressing issues of culture and adoption that limit the pace at which any improvement can be achieved.

The ideas in the paper are based on experience with our VPS (Virtual Private Secretary) project (Tagg et al 2009). This project aims to ease information overload by providing software support similar to that which a human secretary might provide.

Section 2 of this paper summarizes user feedback to some demonstrations and presentations of VPS prototypes. Section 3 describes certain extensions proposed for VPS (and PIM tools in general) in the task management and user interface areas. Section 4 reviews some other notable PIM projects worldwide.

Section 5 raises issues of adoption of new technologies, both in general and for PIM in particular. Section 6 offers some concluding thoughts and ideas for future work.

2 THE VIEWS OF USERS

In (Tagg and Beames 2009) we raised the question "what will it take for a critical mass of users to change from the toolkits they currently use for PIM (e.g. MS Outlook or Lotus Notes) to a new, more intelligent and more task-oriented interface for everyday information and communication management?" We suggested that, as well as a major software improvement, a change in human-to-human etiquette will be needed. For example, current culture is to send messages to other users without any contextual clues for the receiver.

In early 2009, two of the current authors had held detailed interviews with a small sample of potential users, including an academic, an administrator and a marketing manager.

To follow this up, the other author carried out two informal surveys of user habits and cultural attitudes. Respondents were attendees at "project fairs" at which his Honours project (involving extensions to VPS) was demonstrated – along with other student projects - to industry sponsors, academics and other students.

2.1 First user Survey (June)

45 respondents were asked about their level of use of email, their experience of overload, their use of email for task management and their priorities for improvement in email tools.

A majority (60-65%) check their emails at least every morning, and file emails in folders. 82% admitted experiencing some degree of information overload, half of these putting the blame largely on email. Respondents' task management was not sophisticated, 82% leaving task-containing messages in their inbox as a reminder. However only 40% thought that they needed specific task management facilities, and only a similar number were even aware that MS Outlook contained a Tasks subsystem. Only 18% saw themselves as ever taking a "tasks first" view rather than a "read all the messages first" view.

2.2 Second Survey (November)

In the second survey respondents were asked only about their task management practices and how they would react if they were required to provide more clues when requesting other people to perform tasks, or to change to using PIM tools that were more task-oriented. 29 responses were received (17 students, 8 industry and 4 academics).

Asked how they currently manage their "to do" list, responses were widely scattered (see Table 1).

Table 1: "To-do list" approaches used by survey respondents.

To-do list method	Respondents
MS Outlook Tasks	9
My mobile phone	11
Special "to-do list" software	2
Set up tasks as calendar appointments	4
Mark the emails as "unread"	7
Write in a diary or filofax	5
Write on a loose sheet of paper	9
Keep it in my head	4
Other (inky palm, whiteboard, QuickNote)	4

Many respondents said they integrated their total list of "to-do" items through email. However, when requesting tasks from others, they gave phoning, texting or even asking face to face equal preference. The reaction to changing to using more task-oriented tools was that if asked to do so, over half the respondents would conform – but with 50% of respondents being students, this may not be significant.

2.3 Comments on the Surveys

Most people we surveyed seem to have built up their PIM practices over time by experience of working with whatever tools they have been given. An informal comment was noted that said "it's not my job as an email sender to categorize for the receiver the messages I send".

3 PROPOSED IMPROVEMENTS TO PIM TOOLKITS

3.1 Task-oriented Assistance to Receivers of Messages

Work on VPS in 2008 (Tagg et al 2009) led to the development of a prototype system for pre-categorizing incoming emails through the use of an ontology and lexicon controlled by the receiver.

In trials of this prototype, it was found that while the system could adequately recognize the work topic to which an email belonged, it was less good at recognizing "taskiness", i.e. how likely it is that the message sender is actually asking the receiver to do something important, and what sort of action (e.g. acknowledgement, reply, vote casting or sending of an attachment) is required.

It also became clear that our potential users did not want "yet another software tool" such as our VPS prototype would have been. Therefore in 2009 we re-implemented it as a potential "myTasks" extension to the university's existing web portals used by staff and students, using the same ASP.NET technology as in that portal. However we later discovered that the portal appears to not be widely used as a starting point for users' general PIM work, and the portal development team did not encourage our efforts.

3.2 Encouraging Message Senders to Give More Clues

Given the problems in identifying taskiness, we have conjectured, along with other researchers, that a change in the current culture, in which senders would be encouraged to make any task requests more specific, is perhaps needed.

In an earlier prototype (Tagg and Mahalingam 2005), we attempted to require task requesters to complete mandatory fields on a web form, but the feedback was that most message senders would not be prepared to do this in the current culture.

We have instead proposed a “privileged senders” approach whereby a receiver can say to senders “if you give me better clues, I can attend to your requests more quickly”. A possible choreography is shown in Table 2 below.

Table 2: Suggested choreography for a “Privileged Senders” add-on.

Receiver	(Message)	Sender
(Install “privileged senders” add-on)	Invitation to be one of my privileged senders--->	(Install “privileged senders” add-on)
(Store sender details)	<-----Accept	(Store receiver details)
(Receiver’s PIM agent categorizes the message and infers any task)	<-----Send marked up message	(When sending to such a receiver, get a prompt to mark up the message)
(Review task status)	Acknowledge and agree/refuse--->	(Manage delegated tasks)
(Complete the task)	<-----Reminders and changed deadlines	(Check the receiver’s response (manually or automatically))
	Progress report or extended deadline request	
	“Done” message (manual or application-generated)--->	
	<--Accept or reject the result	

To support this, a data structure, as shown in the entity-relationship diagram in Figure 1, would need to be held by both senders and receivers.

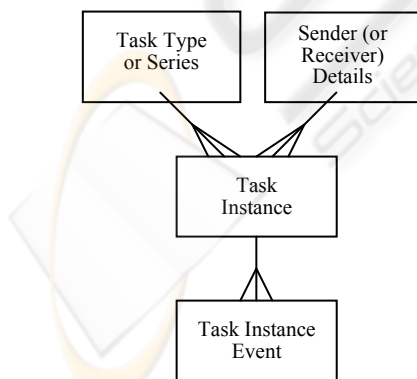


Figure 1: Data Structure to support a “Privileged Senders” add-on.

Receivers would, of course, also need to maintain their personal ontology of work categories, some or all of which would be publicized to senders. A

sender-side prompting function would access the receiver’s ontology, using either a web service or a local copy.

3.3 Compliance Management

This is an extension to “privileged senders”, intended to support users who receive so many task requests that they find it hard to remember where they have got to on each task. At the simplest level, a user might wish to check whether the requester regards the task as done or not. The choreography for this is shown in Table 3 below.

Table 3: Suggested choreography for a “Compliance Management” add-on.

Receiver	(Message)	Sender
(Install “compliance management” add-on)	<---Advertise offering of a compliance service	(Install “compliance management” add-on)
(Store sender details)	Optionally register in advance----->	(Add compliance info to receiver details)
(Receiver’s PIM agent recognizes the task)	<---Send a task with option to join the compliance service	(If it is a new task type or series, set it up – otherwise start the task instance)
(Review one’s to-do list)	Optionally register on the fly ----->	(Check receiver’s compliance status by web service)
	Check my compliance----->	
	<-----Compliance status	

The data to support Compliance Management would have the same structure as in Figure 1, but would have additional fields. However a major addition would be needed on the sender side, namely the “Compliance Register”. This would be a web-accessible database that would respond to “Check my Compliance” requests, for which a user login and task id would be required.

It is worth noting that tasks are rarely stand-alone, but form part of multi-stage business processes. There is therefore a likely need for more integration between PIM systems used for task management and communication of tasks, and Workflow Management Systems.

3.4 Visualization Improvements

The “inbox” metaphor is well ingrained for both email and tasks, but may well not be optimal. One commonly proposed alternative is a spatial layout,

with task clusters dotted around the desktop.

In the “Task Type Thumbnails” (Bardram et al 2006); and “Scalable Fabric” (Czerwinski 2006) metaphors, task groups are represented by thumbnails which expand when double clicked, the other task groups being downsized and moved to the periphery of the screen. Another example is the “paper piles” metaphor suggested by (Lam 2005), illustrated in Figure 2.

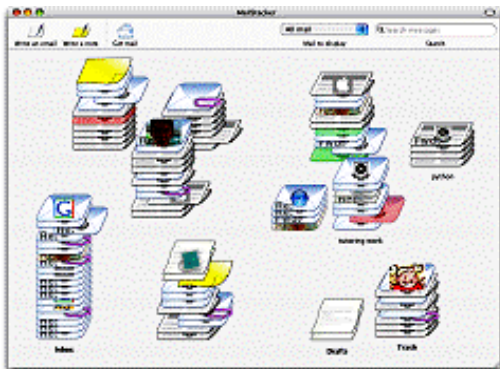


Figure 2: Paper Piles interface as proposed in Lam's (2005) MailStacker prototype.

Task Vista (Bellotti et al 2007) uses a paper notebook metaphor with tiles for task groups, and links to documents and people. Lotus Connections (IBM 2009) uses an “office telephone metaphor” with buttons for frequent task groups.

Several prototypes have attempted to represent visually the flow of tasks within a larger process, e.g. by showing task threads (Bellotti et al 2007, Kerr and Willcox 2004) or by mapping emailed tasks onto a horizontal time scale, e.g. TaskView (Gwizdka 2002).

A number of systems still use inbox-style task lists but with add-ons such as pop-up windows, coloured flags, etc. Examples include coloured icons (Bellotti et al 2007); and intuitive icons for task groups (Ferreira et al 2005).

Task Tracer (Stumpf et al 2006) offers prediction of which task area an email belongs to, and a Task Explorer that shows all the documents that relate to that task. TaskMinder (Landry et al 2002) uses varying font size text to represent different priorities in a clickable summary list.

A number of interesting visualization models have been proposed for ancillary perspectives. Dionypos Task Recognizer (Rath et al 2008) uses an “electric light” icon with radiating spokes indicating what documents have been accessed, in order to give clues to recognizing tasks. Collaboration Maps (Hawryszkiewicz 2008) and Participation Maps

(Constantine 2006) address the need to show a model of human as well as computer-related interactions.

4 RELATED WORK

While a number of research teams have been working on PIM for around a decade, it appears that little of this good work has so far found its way into mainstream commercial PIM tools. Most projects in the table below include some degree of recognition of tasks, use of ontologies and integration of the multiple PIM functions. Most have also integrated their tools into email clients, which are regarded as a natural conduit for tasks (Whittaker et al 2006). However many of these projects have now been terminated.

Table 4: Other recent PIM research prototypes.

Research Group	Prototype	Reference
PARC	TV-ACTA	Bellotti et al 2007
Microsoft Research	SmartMail	Corston-Oliver et al 2004
IBM (Lotus)	Connections	IBM 2009
IBM	Remail	Kerr & Wilcox 2004
IBM	Activity Explorer	Muller & Geyer 2004
IBM	Scout	Sow et al 2006
Open Software	Chandler	Chandler 2008
EU / Uni of Kaiserslautern	Nepomuk	Sauermaun et al 2008
EU consortium	DELOS/TIM	Catarci et al 2007
Carnegie-Mellon SEI / DARPA	RADAR	Freed et al 2008
Pi Corp	Smart Desktop (was Task Tracer)	Naone 2007

Apart from these there is a vast number of email add-ons being developed outside of research teams, both commercially and as freeware/open source. Examples include Google Gmail Tasks, Xobni, ClearContext and Nelson Email Organizer, targetting especially Microsoft Outlook and the open source client Mozilla Thunderbird.

5 ADOPTION CHALLENGES

A major challenge in introducing any PIM improvement is not just to make a good tool; it is to motivate users, both individually and in groups, to actually use it.

5.1 For Individuals

Rogers (1983) describes a number of models

affecting the adoption of any innovation. One describes the adoption stages in which a user proceeds through, from first becoming aware of the innovation (“knowledge” stage) to using and continually evaluating it (“confirmation” stage). Another model describes the features which may affect the rate of the adoption of an innovation, including the “relative advantage” a user will gain from its use and the ability to trial it before full adoption (“trialability”). Categories of user types and their characteristics relating to their rate of adoption of an innovation are also given.

Another prominent model looking into the user decisions to adopt a new technology is the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al. (2003). This model consolidates eight previous models to describe four core determinants and their moderating factors for a user’s intention to use a technology and their subsequent usage behaviour.

These, along with other models, provide information about many factors which are expected to affect a user’s motivation and decision to trial and adopt an innovation or new technology, such as PIM tools, add-ons - or functionality that already exists but is not currently used - within their existing tools.

5.2 For Working Groups

The work by Rogers (1983) also applies to groups of users; it describes how the knowledge and usage of an innovation is “diffused” throughout the group, or a larger network. Elements affecting the diffusion of an innovation are the characteristics of the innovation (e.g. its perceived benefits), the means through which it is communicated (e.g. mass-media marketing versus. word-of-mouth), the social system in which it is being diffused, and time (any new product requires time to diffuse throughout a group).

Looking into the motivating factors of the adoption of a new tool within a group or network setting is particularly important when the tool has group functionality, such as messaging or group task management. Often these tools become more useful as more users adopt (as with e.g. Facebook, LinkedIn), and so the users which have adopted at any particular time are interesting as a group, and not just as individuals.

Much depends on the intensity of a group’s work. There is a big difference between e.g. on the one hand, brainstorming meetings and on the other, committees that meet occasionally. In the latter case, many of the tasks are done in the space between meetings; this leads to the importance of recognizing

the workflow connection.

5.3 For Organisations

Organisations should be motivated by activities which can save costs and increase profits, such as raising administrative efficiency, reducing stress on employees and improving service to customers. Successfully deploying improvements to PIM tools, and training users accordingly, would be in an organisation’s interest.

However, it seems that organisations are not yet completely in this mindset. Cain (2006) notes how typical knowledge workers, and even the most highly paid workers, are spending up to a quarter of their work week in an email client (used heavily for their PIM activities), without having been trained to use it effectively. It is perhaps symptomatic that email clients are often used as a user’s primary PIM tool, without any better solution or improvements being considered.

5.4 For Software Vendors

For software vendors, it appears that the risk of a “false dawn” – with consequent embarrassment to a vendor’s brand – may be a reason for reluctance to offer improved PIM tools commercially. Vendors are also aware that analyzing natural language text to determine precise meaning is not yet a mature technology. It is likely that open source vendors, whose motivation differs from commercial vendors, may come to play a larger part in the PIM market.

6 CONCLUSIONS AND FUTURE WORK

We believe that dissatisfaction with low effectiveness information work will soon trigger higher priority attention to PIM. However, for there to be any significant change for the better in PIM, several things need to come together. These are:

1. Better integration of task management with messaging and business processes;
2. New, imaginative user interfaces that can attract users to make a change;
3. Entrepreneurial moves by software suppliers (whether established, new or “open source”) to offer add-ons or new “disruptive” products;
4. A culture change among users towards giving more explicit clues to those to whom they send messages.

Improved algorithms for natural language analysis and automated learning of users' work categories will also contribute, but may become less critical if user culture can evolve.

We note, however, that evaluation of all PIM prototypes suffers from the handicap that to get any realistic assessment, a large group of related knowledge workers needs to trial the prototype in as near as possible real-world conditions.

Like many others including DELOS, TV-ACTA and Nepomuk, our own project has come to an end. The plans of Microsoft and IBM-Lotus are not clear, but the RADAR project appears, with DARPA support and a large team, to be making progress in many of the directions discussed in the paper. We hope that their improvements will become widely available before too long.

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