

**Managing personal and work email in the same box:  
overcoming the tensions through new metaphors**

Hilary Smith, Yvonne Rogers and Mia Underwood

Interact Lab, COGS  
University of Sussex  
Brighton  
BN1 9QH, UK

<hilarys, yvonner, miao>@cogs.susx.ac.uk

## ***Abstract***

We are all familiar with the seemingly endless task of sorting through emails to keep on top of received messages; ploughing through list and folder based file structures to find saved emails and file attachments. It can be an ongoing headache. In this paper we describe our approach to helping people manage their personal emails and their accompanying attachments using novel interface metaphors. An initial online survey was conducted on people's email storage behaviour for both home and work contacts. The findings suggest there is a tension between how people currently manage the two and how they would like to do this. Following this we explore new ways of conceptualising storage and retrieval in terms of person-centric storage systems.

## ***Keywords***

Computer-mediated communication, personal media management, contact management, social networks, email

## ***Introduction***

More and more people are increasingly using a wider assortment of communication methods to keep in touch with their friends and family. No longer are these methods confined to the office as the migration of email and Instant Messaging (IM) into the home, coupled with widespread usage of mobile phones (verbal and text messaging) and chat rooms, has led to many people spending much more time managing their online and air-based communications (Ling, 2000; Pew-Internet, 2001; Kraut et al., 2002). A recent survey of British online behaviour noted that home internet users are also increasing their online experimenting with banking, shopping and music downloading (WhichOnline, 2002). This only adds to the expanding task of organising messages and their associated media (e.g. file attachments; personal address books).

The situation we find ourselves in is that, on the one hand, we now have greater versatility in how we keep in touch, but on the other, it requires us to do many more 'housekeeping' tasks (Nardi et al., 2002; Neustaedter and Greenberg, 2002). By housekeeping we mean the activities involved when organising electronic messages such as: deciding whether to save messages; and if saving, where to store them; spending time reviewing and deleting messages; and organising associated media such as file attachments. The problem is exacerbated when we consider that we must do this differently and separately across multiple devices. There is also the extra issue of our work email addresses increasingly being used for personal emails, leading to the intermingling of these different types of messages and the necessity of keeping both sets organised and manageable in some way.

Work based email studies have highlighted the problems of reading and replying to emails in a timely fashion (Whittaker and Sidner, 1996). Here we ask do people feel that personal emails have the same level of urgency? Frequently these days a letter style of email replaces real letter writing to friends and family members. The addition of photographs and other media (e.g. MP3 files) when communicating has been found to support communication in an enjoyable way (Kuchinsky et al., 1999). In addition Frohlich et al. (2002) found that digital camera technology was used increasingly to distribute photos electronically to accompany communications with friends, families and remote acquaintances. However, the down side is that with the increasing use of photo media on mobile phones, the resultant explosion in the size of peoples' media storage could become a daunting management task. Whilst the area of computer mediated communication (CMC) and email overload in the workplace is well researched (Ducheneaut and Bellotti, 2001; Willis, 2001), the crossover of personal and home-based email management together with the multiple systems for this has received little research.

Following on from previous research into communication patterns among different social groups (Brady and Smith, 2002), we were interested in exploring further how different kinds of people manage both their personal and work communication using the same software tools. In particular we were concerned with how people store, retrieve and delete the two types of messages, whether there are any conflicts between work and personal email management and whether work-based email metaphors, i.e. file folders, are appropriate for both. We explore how alternative metaphors might be more appropriate for personal email such as those that are more person-centric and more spatially flexible in how they map onto organising.

One way this could be achieved is to re-conceptualise personal email management in terms of 'pottering'. By pottering we mean the pleasurable activity of rummaging for something, which can lead to the serendipitous discovery of other forgotten (but treasured) items, for example in an infrequently used drawer. This type of sorting is characterised by the way one gets easily absorbed by it; one treasured artefact can trigger reminiscences and then curiosity about what else is available to be rediscovered. We propose capitalising on this form of organising, instead of seeing personal email management as a chore it could be re-conceptualised as a form of pottering.

Some suggestions have already been made to determine how we can design housekeeping activities to be more fun, aesthetically pleasing and challenging (Blythe et al., 2002). For example, by introducing products into the home that exercise our minds whilst conducting these tasks, or by changing our domestic appliances such as washing machines to better suit the way they are actually used, rather than the way they have traditionally been used. In a similar fashion, we propose thinking about activities that we perform to service our email inboxes, answer phones and mobile phones (such as pottering, sorting through and re-reading our messages and their attachments; reviewing documents on our desktops, filing them away if not currently being worked on) as being a form of *message pottering*.

In this paper we explore the question of whether people find message organising to be a chore, and if so, how might we better support people confronted with this in making the activity more enjoyable? We describe a study of people's communication activities and based on this identify a number of possible metaphors that could enable people to turn 'message and media organising' into a more enjoyable experience that is related to the pleasurable activities of pottering and reminiscing.

## **Background**

Multimedia organisation and retrieval systems are not a new idea (e.g. Kominek and Kazman, 1997; Kuchinsky et al., 1999; Balabanovic et al., 2000; Lesh et al., 2002). Kuchinsky, Pering et al. (1999) studied how home and business usage differs when organising and retrieving photographs. They found that keyword-based searches were most easily understood by home users. However this comes at a cost of inserting meta data at storage time, for example the subject, date, location and identities of people in each photo. Most interesting was a second finding that home users are more favourable to the idea of *browsing* than were the business users. FotoFile was designed as an organisation and retrieval system for digital media, specifically for ease of accessing content by non-experts. As such it uses a photo album metaphor and content attributes to support both browsing / storytelling and directed search activities.

Another digital media organisation system, the Personal Digital Historian (PDH) created by Lesh et al. (2002), was designed to support browsing collaboratively and history sharing by small groups of people. The user interface is projected downwards onto a tabletop where participants sit around the display and interact via two Mimio™ pens. Media are laid out and stored in hierarchical groupings and retrieval is based on the four questions used in storytelling: who? what? when? and where? Initial evaluations of the system found that participants from the lab enjoyed sharing stories in this way with all looking for pictures of themselves; and most were able to use the navigation and views to present a story they were asked to create. This suggests that browsing and reminiscing are pleasurable activities and can be used in a goal-directed way. As such, they could be capitalised on for message organising.

From this recent work and our own studies we have identified a number of potential metaphors that could help with communicating about and storing digital media. The ideas of browsing and pottering have been highlighted. In addition we sought inspiration from social network mapping. The literature on personal social networks has come up with a number of visualisations for organising contact details (Farnham, 2002; Whittaker et al., 2002). The idea of using a person-centric metaphor to organise personal messages and media has come from this literature and is used to inform the metaphors we propose.

## ***The study***

We designed an online questionnaire to examine how people manage their personal and work email communication, and to see what the level of crossover was, to understand what people do and how they think about these tasks. We were interested in the frequency that people perform tidying and sorting tasks, and whether they find these organising activities manageable and enjoyable or not. The questionnaire was prepared as a short email survey and contained twelve questions about personal and work email sorting and storage. It was sent to an electronic distribution group called 'social',

comprising 330 academic and administrative staff, and post-graduate students. The questions asked about numbers of messages in inboxes, the proportion of these that were personal messages, how many received personal messages were saved, how messages were organised, frequencies of reviewing and sorting and personal beliefs about the housekeeping tasks associated with their email.

Respondents were asked to select which statements they agreed with about email sorting and storing. Examples of these statements are: "I don't have many emails to clear or sort"; "I don't let my emails get out of hand"; "I enjoy it a great deal"; "It is a boring chore"; "I use it as an opportunity to review my old emails" and "I enjoy being reminded of the person who wrote to me".

The emailed survey was voluntary and respondents were then invited to participate further in an in-depth interview on this subject. Four participants were subsequently interviewed and were paid £10 each for their time. These sessions lasted approximately 40 minutes and were audio recorded. More detailed questions about their email and personal file management behaviours were asked.

## ***Findings***

We received 46 responses to the emailed questionnaire from the 330 names subscribed to the distribution list. This equates to a response rate of 14%. The main findings from the questionnaire were:

### Stored email messages

- Over half the respondents store 100 or more messages in their inbox, a quarter store over 500 messages and 9% store over 1500 messages. Most of these messages had been read, a small number of participants said they were playing 'catch up' with their inboxes, and others said they used automatic filtering to store certain messages (e.g. from distribution lists) elsewhere so they could be read when time permits.

### Folder usage

- 89% of respondents use folders to organise their messages. The average number of folders used to store messages was 57 (SD=137). 61% of these people have one or more folders labelled using a person's name.

### Message housekeeping

- 41% of respondents keep less than 10% of their personal emails whilst 37% of respondents save half of this type of email or more. Some people reported that they save emails so that they have a type of diary of what is said and done.
- The reviewing of saved personal emails seems to be relatively infrequently done: over 61% of respondents review these emails annually, rarely or never. Some people only did this when they needed a particular detail from a message, or to remember the exact words used in a message.
- Some respondents archived off vast collections of emails to help their email client run faster, without having to lose their messages altogether.

### The tension between work and personal emails

- Over half do try to keep personal and work emails separate: 54% of respondents have a separate home account that they use for personal emails and to keep their work address free from spam email. However, not all of these people manage to keep their work email account free from personal emails, nor would they want to. Those without a separate account mentioned the work involved in remembering to check multiple accounts was a deterrent, and 16% of those with a home account reported they checked them infrequently.
- The reasons for saving work and personal emails differ significantly in that personal emails are usually kept as a reminder of the person writing to them, whereas work emails are kept as a reminder of an action, or reference of completed actions.

## Perceptions of housekeeping

- Over half of respondents (54%) said they did not let their emails get out of hand, and 46% said they only cleared and sorted their emails when forced to because their messages were getting unmanageable.
- The browsing of personal emails tends to be thought of in pleasurable terms, work email searching or browsing is often perceived as a chore.

We analyse these findings and the results from our in-depth interview sessions in more detail below.

## **Stored email messages**

Over half the respondents (57%) store more than 100 messages in their email inbox, and 9% store more than 1,500 messages. Two people reported that many messages were unread at the time of responding: 398 unread out of 521 messages, and 220 unread out of 1475 messages. Feelings about storing messages in inboxes varied:

*R38: In theory I would like to delete any emails that I don't need to keep when I get them, and move all those I've kept into different folders. But in practice I often forget, and in fact find them easier to manage just in my inbox.*

*R11: I aim to keep my inbox at or less than 100, although I receive >100 per day. I use numerous auto-filing rules to make this easier.*

*R36: I use my inbox as a to-do list. This leads to me being a little hasty at deleting personal mails if I don't have to reply. Though I regret this later.*

*R14: It's the closest thing I have to keeping a diary, keeping all my emails. Also because I am generally rather disorganised, so things like my sister moved house last year, she's emailed me her address and telephone number, and I still forget where I have written it down so I search my inbox and recover it from there.*

This suggests that the inbox can be used for multiple purposes, and this can lead to tradeoffs for maintaining a manageable number of messages in there.

## **Folder usage**

Folder usage is a common strategy for organising stored messages, 89% of respondents reported they do use folders and 61% of these respondents have one or more folders labelled using a name. One respondent reported that they didn't know how to use folders and four chose not to use them.

*R13: I don't use folders, I used to use them with filters but it became too much of a chore to check each folder for new mail. Also it's a chore to move stuff into folders.*

*R19: At home each member of the family has a separate account and all email is kept in my one filing cabinet were it automatically goes when I have read new mail.*

The names people use for folders gives insight into how people organise their messages. The types of folder names people use include project names, event names, and people's names. Ten respondents (22% of total) had just one folder labelled with a name, whilst eleven respondents (24%) had over ten folders labelled as names. These names were usually partners, friends and family, and sometimes names of people to do with their work (see Figure 1).

*R3: I normally have a folder each for funnies and useful links... If I read an email and it's from a friend and I think I should keep that or I'd like to keep that, then I will create a folder for that. I don't put anything in the 'friends' folder, there's always a name [subfolder] within that.*

*R27: I have 866 folders...yes, really - 650 or so go with being [senior academic administrator] and relate to individual students.*

Of the eleven people who use more than ten names for folder names, seven reported that they enjoy being reminded of the person who wrote to them and enjoy re-reading what they wrote to others. It seems that the act of organising emails by person helps transform the ongoing task into a more enjoyable one.

## Message housekeeping

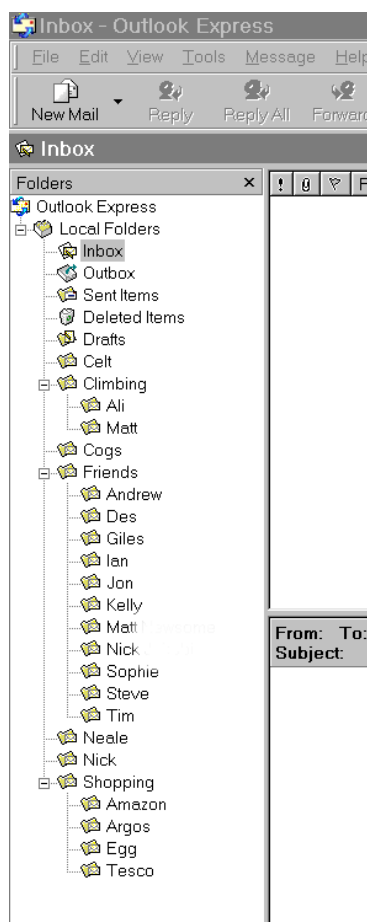
Many survey respondents felt a need to keep their email organised and in control, with 65% engaging in tasks to sort, save or clear their inboxes every day or week; whilst 19% perform these tasks monthly or annually and 15% reported they rarely do these tasks at all.

*R31: I generally go through and delete or archive a few very old emails at long intervals. I archive them in case I need to refer back, even though it never is necessary, but it is easier than deleting them. I hate deleting stuff permanently.*

*R18: I keep a lot of work stuff 'in case I need it' when actually I'd be happier just deleting it all!*

*R19: I delete messages in my [personal] filing cabinet once in a blue moon. I don't get a huge volume at home.*

This suggests that many messages are saved to provide the option to refer back. However this comes at the cost of feeling 'bogged down' by them sometimes.



**Figure 1:** A respondent's folder system that uses people's names and activities in the main.

## Saving messages

There was a wide range in the number of personal emails people saved: 41% keep a tenth or fewer of their personal emails; 22% keep approximately a quarter of their personal emails; and 24% keep three quarters or more of their personal messages. Of the people who do keep large volumes of their messages there was much enthusiasm on the subject:

*R3: I save ones from my partner, not for any sensible reason at all, I just save them, others from friends I don't see all that often. I like to keep them so that next time I email them I can refer back to what they say, what they're up to. I keep friends and family as the same, those from my ex-husband I keep for legal reasons in case I need them. It's handy to refer back to sometimes, others I keep are shopping, confirmation orders and order numbers.*

*R30: It is easy to manage work emails, the choice to keep or delete is straightforward, it is always painful to delete personal email.*

*R19: I usually like to keep the last email from a person, so that it is easier to reply to.*

*R14: The only ones I throw away are the unsolicited advertising ones, I keep stuff so that should I need to I can search through...and because it is interesting to see what you were thinking and doing over long periods, just for reminiscing purposes.*

Some people had decided to keep fairly complete archives of personal or all types of email. Archives were most often saved by date, e.g. annually.

*R18: I've kept an archive of my e-mail since 1995. I stopped deleting anything personally sent to me in 2001.*

*R33: I relish having a complete archive of mail though - even stuff I don't think will be useful. Disk space is cheap!*

*R6: I do not delete email ever... email is not deleted from the deleted items folder... eventually it is archived to CD.*

Having a large archive of past messages is one thing, but how frequently do people actually review or re-read messages? 50% of our respondents do review saved emails at least every year. Of these respondents 74% review them every month or more frequently. However, 48% rarely or never review saved personal emails.

*R46: I don't enjoy sorting old emails, and I don't do it! I use Outlook rules plus hand sorting to sort all my incoming emails; I almost never delete old emails.*

And some people who thought they would review their messages, no longer can:

*R17: I do have a DAT tape at home carrying personal emails going back to 1985, which I can't access since I no longer have access to a DAT drive.*

This suggests that people do not like throwing away messages and attachments. They like to be able to use messages for multiple purposes, such as for references, as substitutes for address book entry and as collections to look at.

### Saving attachments

We asked the respondents whom we interviewed in-depth, how they saved the associated media that came with emails. Most often, attachments were saved with emails and occasionally saved in their normal filing system also. Work based emails were most likely to be saved outside of email clients if there were to be worked on. Attachments to personal emails were often left with the messages they accompanied, though photographs were sometimes saved out into the general filing structure. Remembering where attachments were saved seems to be a particular problem, and the reason why some people keep two copies of the attachment: one in their email client and one in their folder structure:

*R19: I save [attachments] somewhere as well as keeping it in my mailbox, I don't always remember where I put it.*

*R3: It depends what the attachment is, most often it is a file that I have asked someone to send me, a file or document, and I would save that straight to the place I will be accessing it from I don't get that many attachments unless I have asked for them.*

*R14: I'll leave the attachment with the email. I usually look at it and if it is obviously something suspect then I delete the whole thing.*

This suggests that existing folder structures do not always support people adequately to allow them to remember or search where received files have been saved.

### **The tension between work and personal emails**

We asked how many of the inbox messages were personal or friends based and how people dealt with keeping work and personal messages separate. With personal emails, 37% of respondents have less than 5% of their inbox being composed of personal messages; 24% have 5-10% of their inbox being personal messages, and 11% have more than half of their inboxes being personal messages.

Respondents who have a personal email account in addition to their work account totalled 54%. This does not necessarily mean that personal emails were not received at work too. People said they try to keep their work and personal emails separate on the whole: over half of respondents (52%) do try most of the time, 24% do sometimes or occasionally, and 22% never do. One respondent tried to preserve her work email account for work, whilst still having subfolders named 'friends' in both her inbox and sent folders:

*R2: It is annoying to have the emails crossing over between personal and work*

whilst another respondent was particularly protective of her personal account:

*R44: ...and woe betide anyone sending work stuff on it!*

A respondent who regularly used filtering to automate his inbox sorting wherever possible (i.e. for discussion groups and obvious spam) noted that it was not always appropriate to automatically sort all his work and personal messages by the sender's name:

*R14: I tend not to filter on friends because sometimes they are sending me work stuff, it's just discussion groups and unsolicited ones I have managed to identify [to automatically filter].*

These findings suggest that there is a real tension between having personal and work emails all jumbled together in one inbox. Automatically filtering by the sender's name does not always work for dividing personal and work-related messages.

## **Perceptions of housekeeping**

Over half of our respondents (54%) try not to let their emails get out of hand, 39% enjoy email clearing a bit, 48% find it a boring chore, 63% use it as an opportunity to review old emails, 46% enjoy being reminded of the person who wrote to them, and 35% enjoy re-reading their own emails. Some respondents indicated that they would keep the last email from a friend and review it when they were ready to reply. Unlike some of the other housekeeping tasks, this was an enjoyable reminder of friends and family.

*R21: Receiving personal emails is more pleasant, it's more social [than work]. Sometimes it is quite uplifting to read what someone has written to you personally. I have some good contacts from friends re-united, it's when the internet can be really fun. It's not a weekly thing, but every few months it's nice to hear from them.*

*R3: I enjoy email and don't find it a chore to sort things out.*

*R21: I only get on it about 3 times a week on the pc at home, it's probably monthly that I cast a general eye over [personal emails]. At work it is very infrequently, I review the inbox as I go and the rest are high days and holidays, once in a blue moon.*

*R44: The sheer endless volume of junk (around 50%) of my current inbox - just takes so much time that I lose enthusiasm for my actual messages.*

*R14: Occasionally I will come across an email that is funny, but I am usually reviewing old email for a specific purpose trying to find some specific information.*

These findings suggest that reviewing old emails is a commonplace activity. In addition, a lot of pleasure is gained from reviewing favourite messages e.g. those that are particularly funny, or from close friends and family.

## **Discussion**

Our findings from the survey show that people do think about their work and personal emails in quite different ways. It is becoming increasingly common for people to use just one account or email client for all their messages. There is an ongoing struggle to separate out the two types of messages and perhaps not treat all personal messages as dispensable once replied to. In contrast to the perceived urgency of work emails (Whittaker and Sidner, 1996), we found that personal emails often do not have the same level of urgency. A letter style of email with current news and maybe an attached photo was not considered to be something in need of immediate reply by our respondents. Instead it was perceived as something that could be saved and enjoyed at leisure, and time would be made available to reply when interesting news or events came up. In general, the lower number of email messages to personal accounts helped to make this possible.

We found that the tendency to hang on to email messages is not strictly for work based emails, it also transcends to personal messages. It was apparent that although people feel a need to store a large number of incoming and outgoing messages, not all of them take the time to re-read or review their message store at a later date. In addition, some people commented that they used their inbox (especially in work) as a 'to do' list and would delete messages when the action had been dealt with in the interest of not feeling overloaded. This behaviour would sometimes be applied to personal emails whereby messages would be responded to and then deleted, though sometimes with later regret. We found that people are generally happy with how they deal with their work emails, their folder structures work well and finding messages at a later date is adequately supported by the search functionality of email clients. People also reported they enjoy the occasions when they stumble across a fun email when looking for something else.

From our findings we propose that new metaphors could help us to think about how to manage personal messages, motivating people to 'potter' through their collections, enjoying serendipitous discoveries and reminiscing as they go.

An alternative approach to conceptualising personal email management is to capitalise on a more visual and spatially flexible method of storing messages and media. Following on from the use of people-centric contact management systems (Boyd and Potter, 2002; Farnham, 2002; Whittaker et al., in press) we propose that storing personal messages and media by the name of the person the item is about, or from whom it was sent, is a motivating way to undertake browsing and pottering activities.

We suggest that the non-reviewing behaviours we observed may be linked to the existing list structure that most email clients present to users. The list structure was created for the business environment first, where email was introduced, and remained as personal or home-based use of email became popular. It appears that browsing and pottering activities may not be encouraged by such a metaphor, and instead we should think more about how new metaphors can introduce a more fun aspect to message management.

Conceptual models provide a description of the integrated ideas of what is built to solve the problem space (Preece et al., 2002). One way of designing an appropriate conceptual model is to select an interface metaphor, and flesh out aspects of the model iteratively. Alternative metaphors to the desktop for document management have been proposed. For example, Placeless Documents (Xerox PARC, 1999), where documents that are organized and managed according to their properties, rather than according to their location; and LifeStreams (Fertig et al., 1996), a time-ordered stream of documents that function as a diary of a person's electronic life. Here we propose three metaphors for personal message management that embrace the themes of pottering and person-centric organisation. It should be emphasised that we envision the metaphors as being mostly appropriate for personal messages and media and that a received email of this type to a work email address could be forwarded to such a system rather than managed within the work based email client. Once personal messages are out of the 'work based' metaphor and into these new metaphors the pleasurable side of pottering and reminiscing can be utilised.

## **The grapevine metaphor**

Our first idea is of an isometric (simulated 3D) style of visual metaphor, whereby a series of horizontal planes (or vines) are joined vertically by a central stalk (see Figure 2). This metaphor places emphasis on the organisation and sharing of online media and messages by providing an overall view in addition to more detailed views. Two of the three planes represent digital information and media storage: the top level being a social network style of visualisation for storing contact details; the lowest level being where 'the fruit' or content for grapevine activities are stored.

### Social network visualisation

The top level platforms and sub-platforms are represented by bunches of grapes (for groups of related contacts such as friends, work colleagues or family members) and individual grapes. Grapes grow as necessary to accommodate expanding groups. The grapevine visualisation creates an open map of contacts and news. It provides indications of contacts that are overdue for communications and of contacts from whom a response is awaited to previously sent messages. Information flows around the grapevine by way of communication exchanges and messages. Visibility of the online status of others in the grapevine is indicated and the main person's icon (representing the person whose grapevine it is) is seen standing on the central grape when on-line, but when off-line he or she goes to bed.

## Location

The middle platform is used as an activity area. Someone can drag and drop contacts' icons, files and actions onto these location grapes to initiate a conversation. Here the people icons can interact with each other to create an enhanced chat-room style of experience, where communicating, saving attachments and sharing media files are all integrated into the person-centric style of metaphor.

## Media

Media can be thought about as the props used when interacting with others. Here the user can potter through their archives of files, attachments, music, animations etc. and these can be dropped into a conversation in the middle branch or left behind as a present for someone to pick-up. Items can be dragged into the bottom branch or on to the owner's personal icon standing in the centre of the middle branch to save media.

Humour and playfulness is provided in this metaphor by having animated characters moving around together to represent their pottering and interaction with members of their social network, or grapevine. Message sending to grapevine members involves the message animatedly moving around the sender's and recipient's screens as floating balloons, fireworks or paper aeroplanes. The busy nature of animations can get chaotic, which is intended to convey the fast paced nature of activity on the grapevine.



**Figure 2:** The grapevine metaphor



## Communication

Composing an email, starting a conversation and beginning an instant message chat would be triggered by a mouse click on the appropriate control button; or from inside an ID card. Alternatively voice chat would be used to call the person's name if they were on-line at their desk. The social solar system can be run in several modes e.g. sound off/on, online/free/busy/offline. An on-screen "wave" can be sent to specific contacts in the social solar system to indicate when they would like to initiate communication with someone.

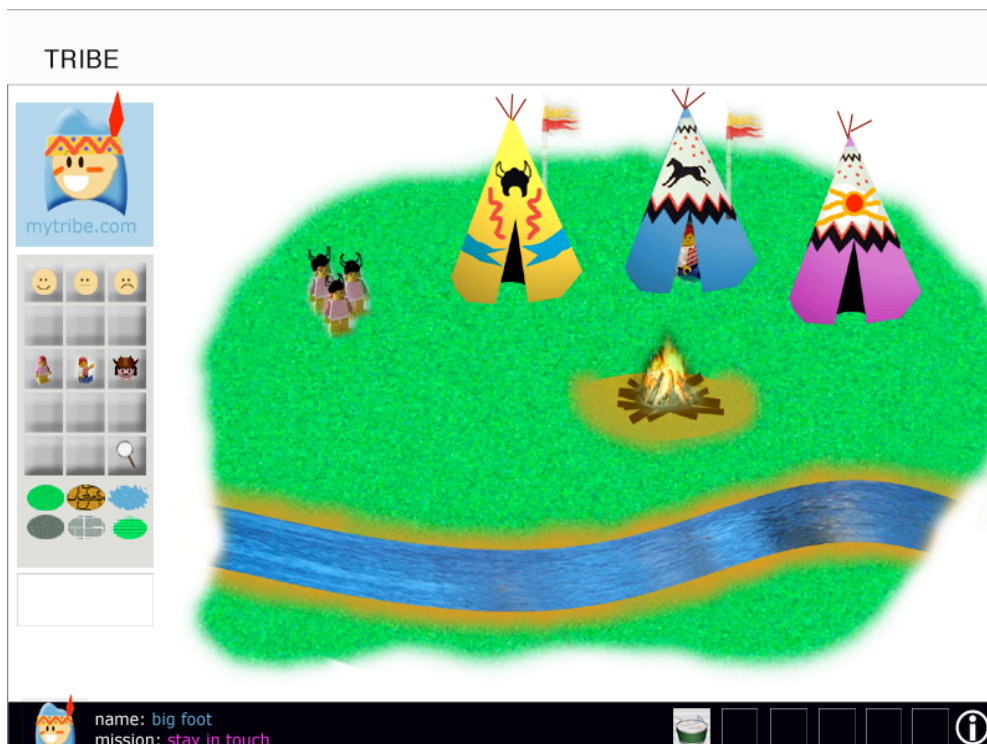
When members are in conversation within the social solar system, a panel in the top left hand corner lists the people who are on-line, whether they are chatting and maybe what they are chatting about if they want to reveal this.

## **The tribe metaphor**

The tribe metaphor emphasises the pottering nature of interaction and entertaining oneself and friends. It uses a tribal camp setting (see Figure 4) for social network characters to interact and spend time 'chewing the fat' around their camp. Tee-pees represent the groups that social network members can reside within, and characters potter by wandering in and out of their home tee-pee, engaging in interaction and activities with others, or simply on their own, e.g. to signify they are at a loose end. Contacts can also reside as non-group members and have a small tent to base themselves within.

## Communication

Tribe members can interact with each other via a range of methods, e.g. instant messaging, email or other messaging formats. A language of tribal customs is used, for example contacts maintain respectful interaction by reciprocal giving of presents, acknowledging their presence with gestures, and sociable object sharing (similar to pipe sharing). Fun elements include the ability to initiate rain clouds over tee-pees when unhappy with someone, sending off arrows with messages attached, gathering round the campfire for a chat, creating messages in smoke signals from the campfire and inviting contacts to enjoy or participate in a tribal dance. Giving gifts is a traditional and fun aspect of the metaphor. During conversations the characters can have fun by cooking food, toasting marshmallows, singing and playing instruments. The emphasis here is to enhance sociability, entertain and make visible your feelings about each other e.g. by placing kisses, halos, arrows, or lightning strikes to make these (normally invisible) social features publicly visible, fun and humorous.



**Figure 4:** The tribe metaphor

Various other messaging methods would be available: the message tree, where messages can be left on the tree to be seen publicly (e.g. for an event, a missing person or a funny poster); and a message stream, where a message is sent downstream and shown as a paper boat, which is then received by a pop-up boat on the recipient's screen. Media files such as music, pictures, or photos are symbolised as presents and passed from one character to another. On random occasions, users find 'surprises' lying around the environment. These, when activated, provide enjoyable aesthetic and aural experiences. Surprises can be given as gifts or may be tools for use in the environment. For example, a guitar can be used around the campfire, a box of fireworks can be used to entertain friends, and a swarm of bees can be used to annoy a contact.

A complete view of the social network (or tribe) is obtained by making the sun shine so that all the members who are hidden away in various places (e.g. tents and tee-pees), come out to enjoy the weather, thus providing a view of each group and individual members within the social network. Contact details for each member are stored on a scroll that the character holds up when the details are requested.

## ***Conclusion***

Our email messaging study revealed that people conceive of their personal and work messages in very different ways. Whilst work messaging can be based around 'to do' lists, personal mails tend to be held more for pleasure. Current email software does not cater well for the non-list style of email browsing that might encourage people to review and tidy up their message stores.

The metaphors we propose introduce the idea of creating a new kind of experience of online communication: one that would provide a pleasurable way of managing personal emails away from work based emails. They demonstrate the concept of integrating the processes of online 'talking', attachment saving and storing, pottering and attachment sharing. Thus, they differ from the existing chat room, email and IM styles of online communication.

For personal messaging we believe it could make message storing, finding and reviewing more intuitive and pleasing to arrange them in a more visual way and by the name of the person the message or media item is about or from. This style of organisation lends itself particularly well to the idea of using a personal social network to visualise the 'filing structure'. Here we propose some initial metaphors for making the message housekeeping activity more fun and in keeping with the pottering activities we engage in when at home. They were developed to provide a means of informing the design of software to be more appealing to a home audience, to be less 'work-based' and more in tune with pottering and reminiscing activities for organising and reviewing stored multimedia.

## ***Acknowledgements***

This study was funded by the PACCIT programme under the ESRC/DTI initiative. We would like to thank our collaborators, in particular Debbie DiDuca, Mark Brady and Jon Yon; and our participants who shared their email habits with us.

## ***References***

Balabanovic, M., Chu, L. L. and Wolff, G. J. (2000) Storytelling with digital photographs. *Computer-Human Interaction*, Storytelling with digital photographs, The Hague, Netherlands, ACM Press, p564-571.

Blythe, M., Monk, A. and Park, J. (2002) Technology Biographies: Field Study Techniques for Home Use Product Development. *Human Factors and Computing Systems*, CHI'02, Minneapolis, Minnesota, USA, p658-659.

Boyd, D. and Potter, J. (2002) Social Network Fragments.  
<http://smg.media.mit.edu/projects/SocialNetworkFragments/>

Brady, M. and Smith, H. (2002) User Needs Analysis, InTouch project, COGS, Sussex University, UK.

Ducheneaut, N. and Bellotti, V. (2001) Email as a habitat: An exploration of embedded personal information management. *Interactions*. 8, p30-38.

Farnham, S. (2002) Visualizing Discourse Architectures with Automatically Generated Person-Centric Social Networks. *Human Factors and Computing Systems*, CHI'02, position paper.

Fertig, S., Freeman, E. and Gelernter, D. (1996) Lifestreams: an alternative to the desktop metaphor. *ACM Special Interest Group on Computer-Human Interaction*, SIGCHI96, Vancouver, Canada, ACM Press, p410-411.

Frohlich, D., Kuchinsky, A., Pering, C., Don, A. and Ariss, S. (2002) Requirements for Photoware. *Human Factors and Computing Systems*, CHI'02, New Orleans, Louisiana, USA, ACM press, New York, p166-185.

Kominek, J. and Kazman, R. (1997) Accessing Multimedia through concept clustering. *Human Factors and Computing Systems*, CHI'97, p19-26.

Kraut, R., Kiesler, S., Boneva, B., Cummings, J., Helgeson, V. and Crawford, A. (2002) "Internet Paradox Revisited." *Journal of Social Issues* **58**: p49-74.

Kuchinsky, A., Pering, C., Creech, M., Freeze, D., Serra, B. and Gwizdka, J. (1999) FotoFile: A consumer multimedia organization and retrieval system. *Human Factors and Computing Systems*, CHI'99, p496-503.

Lesh, N., Shen, C., Frost, J., Forlines, C. and Vernier, F. (2002) Sharing and Building Digital Group Histories, CSCW'02, ACM Conference in Computer Supported Co-operative Work.

Ling, R. (2000) Norwegian teens, mobile telephony and text messages. Technical Newsletter from Telenor Research and Development.

Nardi, B., Whittaker, S., Isaacs, E., Creech, M., Johnson, J. and Hainsworth, J. (2002) "Integrating Communication and Information Through ContactMap." *Communications of the ACM* **45**: p89-95.

Neustaedter, C. and Greenberg, S. (2002) Supporting Coherence with a 3D Instant Messenger Visualization. *Human Factors and Computing Systems*, CHI '02.

Pew-Internet (2001) Wired Seniors: A fervent few, inspired by family ties.  
[http://www.pewinternet.org/reports/pdfs/PIP\\_Wired\\_Seniors\\_Report.pdf](http://www.pewinternet.org/reports/pdfs/PIP_Wired_Seniors_Report.pdf)

Preece, J., Rogers, Y. and Sharp, H. (2002) *Interaction Design*, John Wiley & Sons, Inc.

WhichOnline (2002) Annual Internet Survey. <http://www.which.net/surveys/intro.html>

Whittaker, S., Jones, Q. and Terveen, L. (2002) Managing long term communications: Conversation and contact management. *to appear HICCS 2002*, Managing long term communications: Conversation and contact management.

Whittaker, S., Jones, Q., Nardi, B., Creech, M., Terveen, L., Isaacs, E. and Hainsworth, J. (in press) "Using Personal Social Networks to Organize Communication in a Social desktop." *To appear in Transactions on Human Computer Interaction*.

Whittaker, S. and Sidner, C. (1996) Email overload: exploring personal information management of email. *Human Factors and Computing Systems*, CHI'96, p276-283.

Willis, D. (2001) Computer Mediated Communication- the power of email as a driver for changing the communication paradigm. *Managing the Human Side of Information Technology: Challenges and Solutions*. E. Szewczak and C. Snodgrass.

Xerox PARC (1999) Placeless Documents. <http://www2.parc.com/csl/projects/placeless/>