Short Paper

Paper-mail in the Home of the 21st Century:
An analysis of the future of paper-mail and implications for the design of electronic alternatives

This paper reports ongoing investigations into the use and role of paper-mail communications in domestic environments. It utilises ethnographically informed data to analyse how paper mail supports various social roles within the home, particularly a division of labour whereby women tend to be largely responsible for what may be called "managing the home". Implications for the future of paper mail are considered as well as suggestions made about how email tools may be designed to reflect the patterns of social organisation within the home.

Authors: Richard Harper, Venetia Evergeti, Lynne Hamill and John Strain, Digital World Research Centre, School of Human Sciences, University of Surrey, Guildford Surrey, UK, GN5 7XH

Email: r.harper@surrey.ac.uk

Paper-mail in the Home of the 21st Century:
An analysis of the future of paper and implications for the design of electronic alternatives

Background

In the 1960's, the British Government told the Post Office that it would be out of business by the middle of the following decade. Telephones and thereafter fax would undermine the need for written paper-based communications. The Post Office was to prepare for bankruptcy. Forty years later, the Post Office, through its brand Royal Mail, delivers more letters than ever before. Why is this? How can assertions about the future of paper mail be so wrong? Why is the business continuing to expand?

These questions have become all the more pertinent at the start of the 21st Century when the impact of the "Digital Age" is expected to be greatest. Will paper bills be replaced by electronic bills and presentment (EBP)? Will the much-cherished handwritten letter be replaced by email? And will direct marketing correspondence be delivered to people's internet addresses rather than to their letter boxes?

Finding answers

It is no wonder, therefore, that numerous attempts to predict the future of paper-mail have been commissioned in the past few years. In Silicon Valley for example, the *Institute of the Future* has been funded to look at the future of mail at a global level (http://www.iftf.org) while in Europe, various mail companies have funded similar though smaller scale investigations (e.g., Nikoli, 1998; Coopers & Lybrand, 1995). The same is happening in Japan (e.g. Izutsu & Yamaura, 1997).

All of these studies have themes in common. In particular, they include examination of the increasing uptake of the home PC, increasing access to the internet and the willingness of companies to offer EBP. In combination, these factors are said to provide the basis for the substitution of paper mail with digital alternatives.

This existing research has also highlighted certain cultural factors, such as the resistance to home PCs within certain lower income socio-economic groups in the US. Here disposable income is utilised in quite different ways from higher income families, with an emphasis on entertainment (such as with digital TV) and much less on infotainment, as is perceived to be provided with the Web. In Scandinavia, there is broader acceptance of computer technologies in the home, and thus it is predicted substitution will occur more quickly there than anywhere else. Finally, this research has also uncovered some attitudinal preferences for "quality paper" in mail, which has suggested that mail recipients view the quality of paper as an indicator of the quality of the sender. Colour and envelope design are obviously factors here as well.

The "substitution argument", as it is often known, has turned out to be very useful, especially given that it can use basic socio-economic indicators, such as per capita income, to specify the future rates of substitution. Yet, there are some doubts about the long-term accuracy of this research since the predictions are not being borne out. As with the predictions that paper-mail would disappear by the end of the 1970s, so now there is doubt as to whether these more recent analyses will turn out to be accurate.

This kind of research focussing on the substitution of paper-mail by digital technologies brings to mind similar predictions about the future of paper in office environments. At least as early as the mid-1970s, the "paperless office" was becoming a popular catchphrase, and many pundits prophesized it was merely a matter of time before it became a reality. Investment rates in technology and more user-friendly technology were just a couple of factors that were believed to ensure the eventual paperlessness of offices. But paperless offices never appeared (Sellen & Harper, 2001.

The failure of that revolution—and indeed the continuing failure of paperless offices to materialise—was typically explained (and often still is) by reference to what was called "cultural factors". According to this view, paper continues to be used because those generations of people who were brought up with paper documents find it difficult to move towards screen-based documents and new technological tools. As this generation gradually retires, so digital documents will replace paper.

A conceptual approach that might provide answers

As it happens, investigation of this thesis indicates that there is very little relationship between age cohort and preference for paper. Instead, research has suggested that the reason why paper continues to be so important in office life has to do with its "interactional properties", or those physical aspects of paper which shape the ways in which it can be used in a whole range of different kinds of tasks (Sellen & Harper, 1996; Sellen & Harper, 2001). These may be thought of as the *affordances* of paper.

It is worth mentioning what some of these affordances might be since the parallels between these the affordances of paper-mail would seem obvious. In office environments, paper affords ease of marking. This turns out to be important when people are trying to review the contents of a document, allowing them to write and comment on text as they read. Paper also affords complex, two-handed navigation. This enables users to more effectively get to grips with the structure of a document by allowing them to quickly flick through and feel "where they are" in a document. Paper also affords flexible cross-referencing between multiple documents, allowing them to spread pages out in physical space to read and write "across" documents. This is important when users are trying to compare and contrast between documents or extract and integrate information across documents (all of which are common activities). There are many other affordances that paper offers in many other kinds of tasks. Current digital technologies fail to provide sufficiently adequate alternatives for these same tasks, or at least do not offer them in such an effective amalgam.

An approach to paper-mail

Here, then, is an example of how research into paper use can better inform views of the future and helps explain why predictions of the paperless office have failed to come true. The research that generated these insights required qualitative and observational research methods, which had hitherto not been utilised by those interested in the role of paper. In particular, a mix of ethnographic investigations, combined with a concern for the "interactional properties" of artifacts (which happened to be paper but could be any relevant artifact including computational) lead to insights about the forms if interaction that people in office environments require.

It was in light of this research that the UK Post Office funded a research programme at the DWRC which utilised the same qualitative approach to investigate whether there are similar interactional properties of paper mail—similarly conceived of as affordances—which are and which may continue to result in the use of paper–mail in domestic environments. Some of the findings of this project, with a selection of materials gathered in simultaneous DWRC projects into smart homes, are presented here.

An overview of findings

In brief, the results of the research show that paper-mail does offer specific *affordances* that add value at the point of use over and above the affordances of other communications media, particularly email tools as currently designed. More particularly, the most important of these are those that support how members of households do things together. These may be called "social affordances".

For example, it has been well known for some time that certain types of mail are "broadcast" in the home. Post cards are an obvious example of this. Various attempts have been made to offer similar broadcasting of images in computationally mediated ways, e-card being the least interesting. More creative ideas can be found in for example, Liechti & Ichikawa, (2000). The home net project is also reporting some of the ways families "share" (Kraut et al, 1997). But our research showed that all types of mail can be shared within households. We found this both in our ethnographic data and a small scale survey which showed that women will share up to 50% of the letters addressed to them (this includes all types of letters from personal to direct mail), while men an astonishing 69%, including personal letters.

The interesting issue here is not that they are broadcast, however, it is why. In brief, and given the limits of a short paper, the reasons have to do with how letters in paper form are broadcast and moved around the house in a fashion that supports the social organisation of the family. Sharing or broadcasting letters is one element in this social organisation.

An interesting example and indeed an unexpected use of sharing is the way it is used by parents to monitor and control their kids. This monitoring can take surprising forms. Parents will not only sift out what they believe their children should or should not

receive; sometimes they will ensure that their children know that this is being done. In our ethnographic data, one parent wanted to give a direct mail offer of a loan to her son so that "He would learn to throw it away". The affordance in question here does not simply consist of an ability to share; this affordance may be thought of as akin to the affordance of paper documents to "grease the wheels of organisational life" (Harper, 1998). Here it is allowing parents to teach abilities and skills to offspring that constitutes the oiling of family life (even though the offspring in question may not be as willing as colleagues in workplaces to do as requested!)

There is a related affordance that our ethnography also uncovered and this has to do with how paper mail has to be "bumped into". To illustrate: in one household the parents would open the teenager's mobile phone bill but knew that unlike more responsible members of the household, the teenager would not notice a bill judiciously placed on the kitchen table. Moreover, the teenager's asocial hours meant that there was little likelihood that the parents would be able to have a ceremonial handing over. But the paper bill could be placed in front of the teenager's bedroom door—so this is what they did. Now although the teenager could still manage to walk over the bill—after all it is not that great an obstacle—he could not do so without seeing it. And this meant that he was thereafter accountable for it. Either of the parents could then ask, "Well, what about that phone bill? Have you got enough money to pay for it?"; "What did I say about the price of the mobile phone?", and so forth. In these ways, then, the fact that paper mail could be placed anywhere provided a key tool in the management of parent-teenager relations.

Managing the home

The monitoring of kids is one thing, but using mail to monitor other members of a household often has to be more discreet than this. So, for example, in another example from our ethnographic corpus, a wife monitored whether her husband had opened a direct mail catalogue that she thought might be of interest to him. Having identified the article as of interest at the doormat, she then placed it where he would see it and then waited two days to see if he did anything. After two days, he had not done so, si she threw it away. In another case, the fact that after two days a husband had not done anything with a bill placed by his bedside prompted the wife to take up the task for herself.

In these ways, the use of paper mail turns out to be more like workflow control than in the earlier examples where mail was used to support family monitoring (where issues of discipline and learning showed themselves). Workflow is a grand term for technologies (typically electronic and interactive but not always) used to manage, co-ordinate and monitor tasks. Our findings show that paper can be one such technology in a household. Putting a bill on the kitchen notice-board so that it gets noticed and paid may be thought of as workflow management, as is putting a bill inside a handbag so that it is found when one goes to the shops.

It is the corporeality of paper-mail that supports these "workflow affordances". Placing a bill in a particular place notifies all concerned what stage a set of tasks has reached. By the same token, the ease with which paper can be moved between points in the domestic workflow regime makes it a technology that can be used with minimal effort.

Email in the home
The affordances of paper mail that are relevant here might seem rather mundane. The fact that a letter can be seen to be in one place rather than another hardly seems a discovery worthy of the name; the fact that a letter can be moved easily is hardly a world shattering finding. But these properties do start to show their value if one compares them with what one can do with electronic alternatives.

Consider this: email messages can be delivered to one person and presented on a single screen anywhere in the home. Now disregarding questions of about what a message might be about, what our research suggests is that as soon as mail is sorted, recipients within households often start broadcasting it—or at least sharing it in one way or another.

It is at this point that some of the differences between email and paper-mail start to show themselves. Sharing may be supported in a sequential process with email, when for example, a mother and child take turns with a screen. Alternatively, it can be shared concurrently, with various members of the household having their own screens in various places.

Yet either scenario has problems. In one of the examples above we saw that sometimes it is the physical handing over of a letter that is a key moment in the process of sharing or broadcasting in domestic settings. Email tools cannot readily support this: i.e., though they can be used to send or forward messages, what they don't do is support the physical and ceremonial handing over in face to face situations.

Email tools cannot readily support this: i.e., though they can be used to send or forward messages, what they don't do is support the physical and ceremonial handing over in face to face situations. We have remarked (though not explored greatly) that where a letter is in the geography of the home is a marker of what point a job-to-do has reached. Email might support this if the screens are located in places that equate to locations within the domestic workflow.

Unfortunately there are at least two reasons why this might be difficult to achieve. First, there would need to be screens in a host of places, and this may create economic difficulties on cost alone. But perhaps a more salient difficulty relates to how these locations are rather flexible and differentially graded. Sometimes the fact that a letter is in the living room means it is a job-to-do-today but at other times it simply allows a recipient to pick up a letter up when they are, let us say, having a cup of tea. In other words, the same place can be used for more than one task. According to this view, for email to offer an equivalent affordance to paper-mail, not only would there need to be many screens throughout the house, but users would have to forward messages to each screen dependent upon a complex of factors, some of which are ambiguous as the last example shows.

There is another issue over and above the allocation of messages to the right screen (which might not seem, after all, such an onerous task). This has to do with whether email can allow members of shared households to monitor one another. The physical demonstrability of paper-mail results in what one might call "System State Monitoring" being done unobtrusively and easily: a wife can see at-a-glance that her husband has not done anything with a bill by the bedside, for example. With screens, such monitoring would become more difficult and intrusive: a wife would have to look over a husband's

shoulder when he or she is doing his email, for example, and what then for the delicate balance of power—and more importantly symbolic power—within a marriage?

A key property of paper-mail is then that it acts as a successful technology because it *fits* into the physical organisation of the home easily. Email alternatives could deliver mail but would not provide the embodiment that facilitates the intersecting of space and social roles within the household.

Predicting the impact of email in the home
Although there might be difficulties, there could be ways of forcing email in to the home. Two come to mind.

First, recipients could change their mail-related behaviour. Instead of subjecting their mail to what one might call a process of triage which involves somewhat casually planning out some things "to do now" and some "at a later time", recipients of email could instead be more instantaneous in their reactions, paying bills as soon as they arrive for example, and managing the workflow within the home in a rather heavy-handed way: a wife would not simply watch to see if her husband does pay a bill, say, but would pointedly monitor his email in-tray in ways we have mentioned.

As it happens, one can imagine many utility organisations being very pleased if the response of consumers to the arrival of their bills was more prompt than it is now. One study by Pitney Bowes (2000) has suggested this will be the case. Here, a pilot group of customers did indeed make payments more quickly than before. Unfortunately, that they did so is precisely what one would expect if for no other reason than the so-called Hawthorne Effect. According to this, subjects will alter their behaviour simply because they are being watched (See also Rubens, S. 2000, for amore subtle review of the issues related to e-billing).

Whether these same subjects will continue to behave in the same way is, we think, quite doubtful. Once over the initial interest in the new method of payment, it is unlikely that recipients of mail (consumers) would accept this. Though both email and paper-mail could be technologies that help sustain the business and social affairs of the home, paper

does so in a way that allows members of the home to remain in charge. With paper, members of households, particularly women, can do things when they want at the speed they want; paper also allows them to monitor this without being intrusive. In contrast, email could force members of households to behave in accordance with the wishes of the letter' sender: something that does not fit into what is sometimes has called the 'natural order of the home' (Rouncefield, et al, 2000; O'Brien et al, 1997, 199; Hughes et al undated). Given these disadvantages, cost incentives could be provided to encourage these changes in behaviour.

A much more likely scenario for the future of email in the home is one where users simply convert email into paper-mail. So if bills were to be delivered electronically, recipients would choose to print them because it is in the paper form that they can be moved around, handed over, cross-referenced and left in certain places to ensure that what needs to be done gets done.

If this turned out to be the case, then it would have a host of implications for the ways in which branding and other characteristics are conveyed to recipients of mail. For one thing, differentiating quality of service through paper or print will be obviated, since all the mail will be printed on the same device.

In any case, a more likely consequence of this scenario is that users would eventually tire of the hassle and cost of printing bills for themselves and would instead return to the practice of waiting for bills to arrive through the door. This would be an especial problem for billing organisations since it may well be that users will also opt to continue having email versions of the bills as well. Thereby the total costs of the sending organisation will increase rather than decrease the organisation's costs.

The reason why domestic users would want email as well is its paper alternative is that the arrival of email might help facilitate the delicate management of their domestic responsibilities: if in the past they would plan their response to mail through reference to, say, the colour of a bill—blue for "Put aside" and red for "Do something about it"—with email they might be able to create a third level of reminder. "Oops! they are sending

email now, I really better pay", one can hear them say. Of course, it is difficult to say exactly how email would be adapted; the point is that it would be one way or another.

Conclusions

Of course, what we have done in this short paper is merely used empirically data to ask more questions than we had started with: if one of the appeals of the substitution argument is its elegance analytically, then one of the problems with the methods we have been using—primarily but not exclusively ethnography— is that they don't always allow us to come up with easy answers. One particular issue one should not forget is that those who proclaim an institutional affiliation to ethnography (such as sociologists and anthropologists) most typically say that they are pleased to produce more questions than answers. Thereby they can disown any concern with delivering insights into the prospects for change in society or the design of technology. As Bannon has recently noted, the promisory note issued with the emergence of CSCW and other related fields in the 1980s that took on board these kinds of ethnographers has not been delivered on (2000: 230-240).

This concerns notwithstanding, in this paper we do think we have presented issues that can be designed for—or at least can allow designers to orient to. What we have been pointing towards is the problem of how domestic email tools need to support workflow, amongst other things, and how current email tools simply don't get designed with workflow issues in mind, except insofar as they allow a serial distribution of activities. Workplaces might be organised in something like that fashion, but homes surely are not.

As is well known, one of problems of workflow technologies is of related corporeality, or the lack of it. That is to say that that when workflow 'objects' are limited to being virtual only, then some of the social organisational properties of distributed tasks are rendered opaque to participants in those tasks. This is one of the reasons why digital only workflow tools nearly always fail (Abbot & Sarin's 1994 paper being the classic explanatory text of this problem). Yet in the home, the need for corporeality—and all the associated affordances which go with it—is as much a ceremonial requirement as it is a prerequisite for members of family to be able to monitor just whose job is whose. Of course members of families don't want to burden themselves with a frame of mind that

they may adopt at work and which says "I need to take account of my responsibilities" (labelled by Anderson, et al, as the egological principle: Anderson et al, 1989). One doesn't go home to take on a new job, after all. But in practice home life is indeed just like work: it is socially organised and people do rely on each other in often complex and subtle ways to share and distribute tasks. But these are the tasks of family life and family living. Home life requires working at too. In this paper we have sketched out what some of the characteristics of that social organisation of work in the home might be.

References

Anderson, R., Hughes,J., & Sharrock,W. 1989 Working for Profit: The Social Organisation of Calculation in an Entrepreneurial Firm, Avebury, Aldershot.

Buckner,K & Gillham, M. (undated manuscript) *Using email for social and domestic purposes: Processes, Practices, Attitudes*, Department of Computer Sciences, Napier University Edinburgh.

Bannon, L. (2000) situating workplace studies within the human-computer interaction fiedl, in Luff, P. Hindmarshm J, Heath, C, *Workplace Studies*, CUP, pp230-241.

Coopers & Lybrand for the European Commission (1996). *Workshop on the Impact of Electronic Mail on Postal Services*. Brussels: European Union.

Coopers & Lybrand Consulting (1998) *Substitution Trends and the Market Potential for Communication Distribution Services*. Canada: Canada Post Corporation (March 4).

De Rycker, T. (1987) 'Turns at Writing: The Organisation of Correspondence' in Verschueren, J. and Bertucelli-Papi, M. (eds.) *The Pragmatic Perspective: Selected Papers from the 1985 International Pragmatics Conference*, Amsterdam: John Benjamins Publishing Co.

Frohlick, D. Chilton, K. Drew, P. (1997) "Remote Homeplace Communications: What is it like and how can we support it?" in Thimbleby,H. O'Conal, B. & Thomas, P. (Eds) *Proceedings of People and Computers 12*, pp38-41.

Harper, R.H.R. (2000a) "Getting to Grips with Information; Using ethnographic case materials to aid the design of document technologies", *Information Design Journal*, Vol 9, number2-3, pp195-206, Information Design Journal Ltd, Milton Keynes.

Harper, R.H.R (2000b) "The Organisation in Ethnography: A discussion of Ethnographic Fieldwork Programs in CSCW", in *CSCW: An International Journal*, Amsterdam: Kluwer, Vol 9, pp239-264.

Hughes, J.A., O'Brien, J. Rodden, T. Rouncefield, M. & Viller, S. (undated) *Patterns of Home Life*, Dept of Sociology, Lancaster University.

Izutsu, I. & Yamaura, I. (1997) "Effect of Telecommunications on Letter Mail Services in Japan", proceedings of the *Conference on Postal and Delivery Economics*, June 11-14, Helsingor, Denmark.

Kraut, B. Sherlis, N. Maning, J. Mudkophadhag,T. & Kiesler, S. (1996) "HomeNet: a field trial of residential use of the internet", *Proceedings of CHI 97*, pp77-90.

Nikali, H. (1995) "Replacement of Letter Mail by Electronic Communication to the Year 2010," in *Commercialization of Postal and Delivery Services: National and International Perspectives,* edited by M.A. Crew and P.R. Kleindorfer, Boston: Kluwer Academic Publishers, pp223-235.

O'Brien, J. & Rodden, T. (1997) "Interactive systems in domestic environments", in *Proceedings of DIS'97*, ACM Press, Amsterdam, NL, pp247-259.

O.Brien, J. Rodden, T. Rouncefield, M. & Hughes,J. (1999) "At home with the Technology: An Ethnographic Study of a Set-Top-Box Trial", *ACM Transactions in Computer-Human Interaction,* Vol 6, No 3, Sept. 1999, pp232-308.

O'Hara, K., & Sellen, A.J. (1997) "A Comparison of Reading On-line and Paper Documents," *Proceedings of CHI '97* (Atlanta, GA.) New York: ACM Press, pp335-342.

Pitney Bowes (2000) *D3 Digital Document Delivery*, ppt slide set, Pitney Bowes, London.

Plum, M. (1997). "The Challenge of Electrnic Competition: Empirical Analysis of Substitution Effects on the Demand for Letter Services." In *Managing Change in the Postal and Delivery Industries,* edited by M.A. Crew and P.R. Kleindorfer, Boston: Kluwer Academic Publishers, pp133-161.

Rouncefield, M. Hughes, J. O'Brien, J. and Rodden. T. (2000) "Designing for the Home" in *Personal Technologies* : *Special Issue on Home Life,* (Ed. Harper, R.) Kluwer, Amsterdam, pp76-94.

Rubens, S. (2000) "Statement design in the new world of the Internet", *Xplor Conference on Electronic billing and statements: Industry trends and practices*, London Heathrow Excelsior, 8th Feb.

Sellen, A.J. & Harper, R.H.R. (2001) *The Myth of the Paperless Office*, MIT Press, Boston, Mass.

Sellen, A.J., and Harper, R.H.R. (1997) "Paper as an analytic resource for the design of new technologies," *Proceedings of CHI '97* (Atlanta, GA.) New