"How Do You Turn A Duck Into A Soul Singer? Put It In The Microwave Until Its Bill Withers": Some social features of a simple technology.

Connor Graham[1], Keith Cheverst[2], Dan Fitton[2], Mark Rouncefield[2],

[1] University of Melbourne, Parkville,
Melbourne, Australia
cgraham@unimelb.edu.au
http://www.dis.unimelb.edu.au
[2] University of Lancaster,
Lancaster, England, LA1 4WA
{kc@comp., df@comp., m.rouncefield@}lancs.ac.uk
http://www.comp.lancs.ac.uk

Abstract. This paper considers some social features of a simple technology - SMS texting - as a means of enabling people to send messages as a routine feature of everyday working life. It uses a rich ethnographic case study of the everyday working usage of text messaging to point to the dangers of 'over-designing' technology' and to suggest that supporting communities is dependent on the interaction between the combination of technologies and their affordances and particular communities and their dynamics

1 Introduction

This paper is not about microwaves (nor ducks nor Bill Withers) but considers some social features of a simple technology - SMS texting - as a means of enabling people to send messages (like the joke in the title) to displays situated in the fabric of a setting. Despite dramatic claims about the social and political impact of texting, on practices as diverse (if not bizarre) as teenage mating rituals and political demonstrations, our interest lies in carefully understanding a more mundane use of texting - to send messages to displays in cooperative work settings. As O'Hara et al. (2002) have noted this presents particular challenges in terms of understanding the unique affordances of these technologies and their impact on individual and social behaviour.

Our main interest here is in technology as a routine feature of everyday working life. In this paper we describe a SPAM (SMS Public Asynchronous Messenger) machine deployed in a residential care setting that care workers (and residents) – to text to and update situated displays remotely in order to facilitate coordination and cooperation with remote colleagues. It is a simple solution to mundane problems: engaged phones, residents who dislike talking on the phone, and the scattering of information through diverse media such as noticeboards, diaries, answerphones and pagers.

Through texting users of the SPAM system may make available to others their location, plans, and activities, and thereby draw upon and reflect social aspects of everyday life that are essential to collaboration and coordination. It is a way of facilitating 'consociation' (Anderson et al, 1993) or the gearing into of working life. Our research documents the various ways in which texts become both the focus of work and a visible record of work that has been done, put on hold, remains to be done, and so on. By embedding messages in the fabric of the workplace, by putting the work on display so that others may be aware of it, these textual representations make everyday work 'visible' or 'socially translucent' (Erickson & Kellogg, 2000). Our emphasis is on studying technology in use, understanding texting as 'everyday occurrences', as constituent features of ordinary workaday activities. We document how the organizational character of texting consists of an explicit sharing of context in order to support (or potentially support) collaboration with others detailing various forms of interaction and 'outeraction' (Nardi et al., 2000) as well as awareness, coordination, and tracking work. Our argument is that such "simple" technology can support a rich layering of interactions as diverse as dealing with spatially distributed physical artefacts and maintaining social spaces or "communication zones" (Nardi et al., 2000).

2 Research setting and technology

This research examines the care workers working at two associated but physically dislocated sites in a small town in the North of England. The two sites are community housing facilities where ex-psychiatric patients, suffering from a variety of illnesses, lived and were cared for by staff. They are subtlely different in terms of the care provided to residents: one site was staffed all the time, even at night, whereas the other was staffed at regular working hours. In addition, in the former site staff live and work alongside the residents, whereas at the latter site staff have a separate office and visit the residents in their semi-independent living flats, although residents regularly visit staff in the office.

The SPAM system was developed to support communication and coordination between these two sites. The requirements for SPAM were obtained through ethnographic study, informational probes (Cheverst et al., 2003) and design workshops. Specifically, the SPAM system was designed to run an SMS messaging application, allowing staff at the two sites to communicate easily by composing messages using an on-screen keyboard displayed on a touch sensitive screen (Figure 1). The SPAM units were placed in a public location in both offices, such that the displays were visible to both staff and residents, but more overtly to staff. When messages are received by a SPAM unit they are displayed on the screen until deleted by a member of staff. Staff can also use their own mobile phones to send text messages to the SPAM displays. The two SPAM units were deployed in the two offices in October 2002 and since then the units have been used regularly.

Fig. 1. A staff member using the touch sensitive display to compose a SPAM text message

A typical use of the SPAM system is described in this scenario:

Jane wants to ask her manager about a resident's medication. The Manager is currently at the permanently staffed site (Location B). Jane tries to telephone that site but the line is engaged. She needs the information now as the resident is asking her for more medication. Jane sends a text to the Manager using SPAM.

Figure 2 below shows how SPAM supports this kind of interaction. The message is sent via a GSM network from Location A (the temporarily staffed site) to Location B (the permanently staffed site). If this message is read a 'message read' acknowledgment or 'receipt' is triggered.

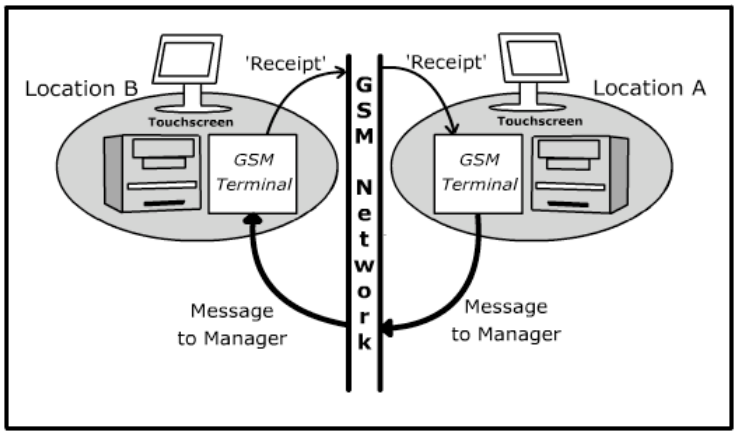

Fig. 2. The process of sending a message from Location A to Location B using SPAM

A less frequent, but possible use of SPAM involves the use of a mobile phone.

James is running late. He needs to get to the permanently staffed office to collect a resident to take her to a meeting. He uses his mobile phone to text the permanently staffed office, informing them that they should ring a taxi for the resident if he is not back in 10 minutes.

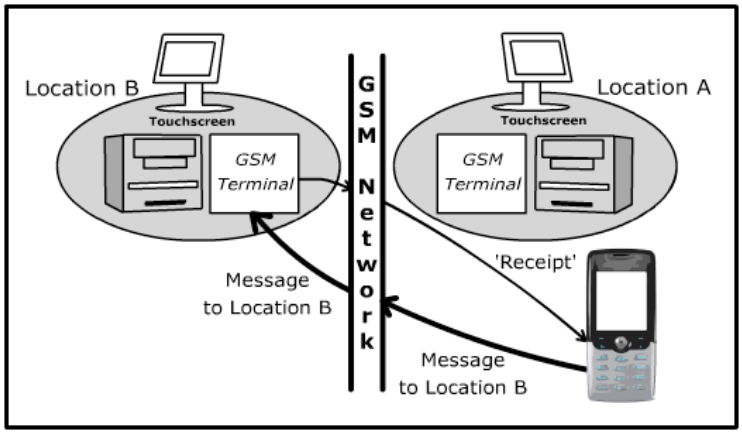

Fig. 3. The process of sending a message from a mobile phone to Location B using SPAM

Figure 3 above shows SPAM's support for this particular interaction. The message is sent via the GSM network from James' mobile phone to Location B (the permanently staffed site). This message would then appear on the display in view of the staff working there. When the message is read an acknowledgement, or 'receipt', is sent to James' mobile phone.

SPAM also allows messages to be forwarded from the semi-independent living accommodation's (Location A's) SPAM unit to the unit at the permanently staffed hostel (Location B). This is to ensure that important messages are still available to staff when no staff member is in the office at Location A. Importantly the SPAM architecture dictates that all messages are routed through the two SPAM units, making it possible to log all text interactions. This is achieved simply by appending messages to a plain text file stored on each machine at each site. An example of a log of messages generated is shown in Figure 4 below. This is a mixture of debugging output from communication with the GSM terminal and 'higher-level' messages indicating that a message has been sent, received etc.. These logs, with irrelevant information sifted out, are the primary source of data discussed in this paper. The technical issues with such filtering are discussed elsewhere (Cheverst et al., 2004).

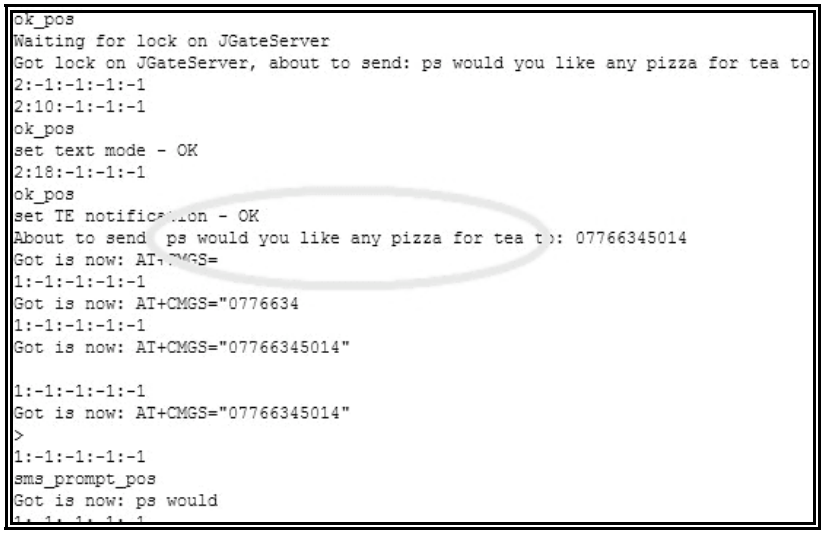

Fig. 4. Log of message sent from Location A to Location B

Elsewhere (Cheverst et al., 2004) we have discussed SPAM's role as a technology probe within the fabric of this setting. Due to the non-intrusive logging functionality, not immediately apparent to the user, SPAM has acted as a particular kind of probe for "collecting information about use and the users of technology in a real-world setting" (Hutchinson et al., 2003). A distinguishing feature of the technology deployed that we wish to stress in this paper is its simplicity and open-endedness: like Hutchison et al.'s (2003) technology probes, SPAM is open-ended and flexible, and has simple functionality and limited choices.

3 Method of analysis

A sample of the mass of SPAM log data was taken for the purposes of this analysis. Our intent was to elucidate features of the use of the SPAM technology. Of particular interest is how SPAM facilitated ongoing "work", or how the interactions facilitated by SPAM related to the core activities operating across the sites.

The categories were evolved through an iterative grounded analysis (Glaser & Strauss, 1967) of the logs of interactions between 6th February 2004 and 23rd March 2004 involving SPAM. A total of 164 messages were sent during that time (not counting 'receipts'). Initially the text logs from one site were examined and themes evolved. These text logs were then cross-checked against the logs from the other site. This resulted in a subsequent version of the themes. Then, through a process of peer debriefing (Guba and Lincoln, 1989) these themes were further expanded and refined into a final version. This refinement involved 'fleshing out' the descriptions of the themes themselves, drawing on additional interviews with staff, referring to field notes collected from both sites and mapping the findings onto research findings from other

studies within a similar domain (Perry et al., 2001; Nardi et al., 2000; Taylor & Harper, 2002; Fitzpatrick, 1998; Grinter and Eldridge, 2001; Isaacs et al., 1996; Whittaker et al., 1994; Tang et al., 1994.).

4 Results

Many themes that emerged related to communication and coordination between the sites. These uses varied from establishing the availability, state or proximity of individuals themselves, others or specific objects (**Presence**), to the everyday management of resources and people across two proximal sites (**Managing Distribution**), to communication that supported and augmented work (**Social interaction**). There were also a significant number of messages that related to managing the process of interaction: establishing if people were there (**Presence**) 'at the other end'; and interactions about the interaction process itself, or **Outeraction** (Nardi et al., 2000). However, the highest number of text messages related to **Social Interaction**, with 31% of all messages sent during this period described by this sub-theme. A snapshot of the frequency of different themes is provided below and an explanation of sub-themes is provided below the figure.

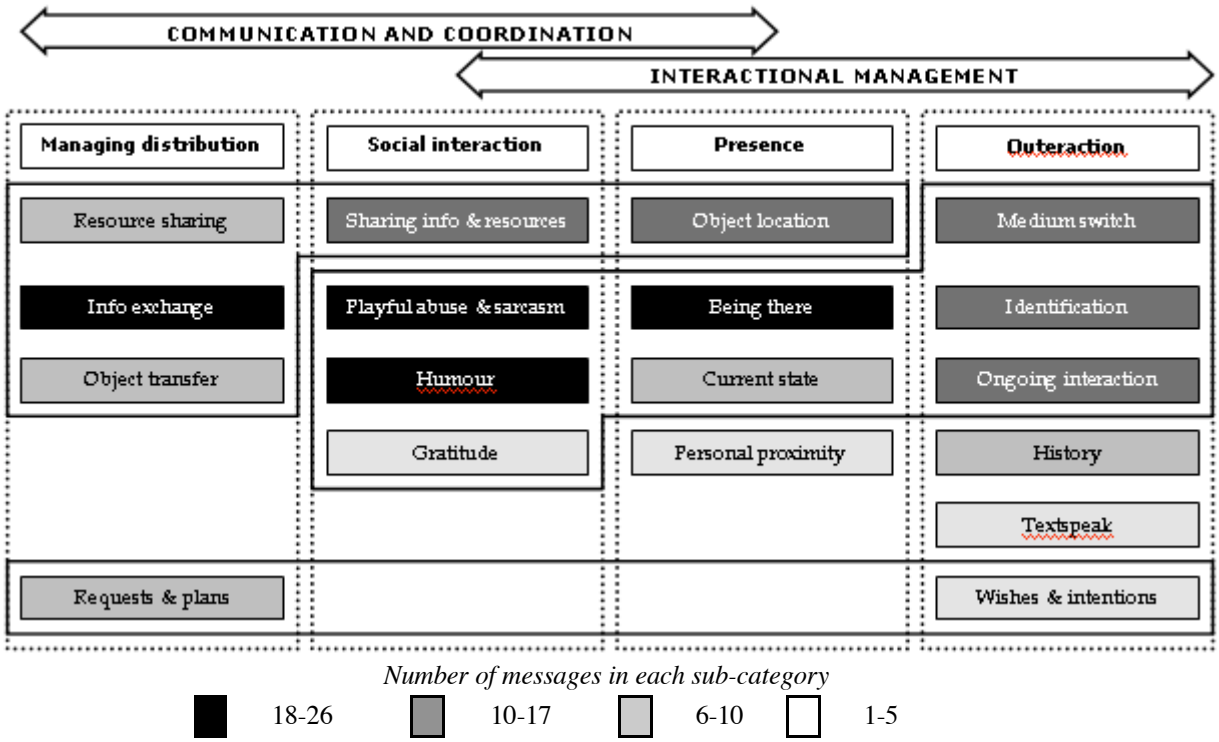

Fig. 5. Summary of themes emerging from the analysis of 164 text messages between Location A and Location B over 46 days.

4.1 Managing distribution

This category describes interactions that occurred specifically because the care work occurred across two proximal sites. In addition, some interactions described by this category were indicative of care workers' movement between the two sites, such as when a request was made for something to be done at the site being moved to. Interactions in this category were the third most frequent (23%). The most frequently occurring sub-category here was *Information Exchange* or work-related interactions that involved the exchange of information. These interactions regarded rules and regulation ('[A] is after aclient loan, what is the situation re loans'), schedules running at the different sites ('when's dinner ready') and urgent situations ('[B] has been on the phone quiite stressed asking for her medication .. says she has been ringing since 6.15'). The exchange of information regarding football scores was also described under this sub category, even though these interactions were not directly work-related.

4.2 Social interaction

Social interaction describes non-"work" related communication, or communication that only obliquely supported work. Although, we can argue that exchange of football scores, for instance, supported social cohesion in the workplace, the mapping of this kind of communication onto the "core" care work is not in any sense direct. There was a sense that much of the communication that is described by this category was about maintaining an open channel where "conversations" could be stopped, postponed and picked up again, concerning football scores for example. The fact that the displays were "persistent and visible" (Nardi et al., 2000) reinforced the openness and availability of this channel. The most frequently occurring sub-categories within this category were *Playful abuse & sarcasm* and *Humour*. The former describes interactions that either made fun of past interactions via SPAM ('are u drunk orjust silly') or of specific individuals ('that has t be you [C] you tll crap jokes'). Thus there was an element of outeraction in the former kind of exchanges: they were about past interactions and were somewhat connected to the management of ongoing interaction. This subcategory also describes when interactions were sarcastic, but not with the intent of insult ('it's a laff a minuit'). The latter sub-category describes interactions that had little function in terms of "work", but a very important function in maintaining the optimism and cohesion of staff. These interactions varied from exchange of fallacious football scores ('liverpool 10 chealse 0'), to jokes about others ('is there any sign of duran duran yet ?'), to plain jokes ('what do you call a dog with 5 dicks lulu and take that.'), to sexual innuendo, to graffiti-like communications (Arsene Wenger for pryminister).

4.3 Presence

The presence sub-category emerged when intertactants communicated information about availability, state or proximity of self, others or objects. Interactions in this category were the least frequent of the four categories described here (21%). The most frequently occurring sub-category within this category was *Being there*. Interactants either indicated their own presence ('that's me'), asked about others' presence ('has the new residant arrived yet ?') or indicated awareness concerning others ('Do you realise that all these messages are looked at Lancaster university'). Thus this sub-category reflected the interactants physical self as tied to a particular location, or other people's physical self in association with a particular location, or an awareness of an "audience" for the messages.

4.4 Outeraction

Outeraction is a notion borrowed from Nardi et al (2000): it describes interaction about interaction or the process of how interaction is managed using a particular form of communication. This could involve "negotiating conversational ability", "establishing social connection" and the interactant needing to "preserve a sense of conversational context" and "manage the communication situation as it unfolds". Embedded in these "stages" is a notion of presence. Nardi et al. (2000) note that this management process tends to happen sequentially. So a communication zone tends to be set up after availability is negotiated. However, these phases are less concerned with the main ongoing "work" of the care workers and more with the ongoing conversation. Like "lightweight" interaction (Tang et al., 1994), these communications were important for supporting ongoing work. Interactions in this category were the second most frequent (26%).

Significant sub-categories under this category included *Medium switch* and *Ongoing interaction*. The former sub-category describes instances when SPAM was used to switch to a different medium of communication, often the telephone ('please ring [Location A] office sap. Thankssss'), but on one occasion the fax machine ('can u pls fax jan rota from 15th. Cheers'). Email was referred to once in the logs, but not with regard to switching communication medium. The latter sub-category describes instances when SPAM was used to maintain communication that may or may not involve using SPAM. Thus, this sub-category describes efforts to maintain communication using SPAM itself, particularly after there were communication breakdowns of some kind ('please repeat message'), or to initiate communication using other media, particularly the telephone ('please contact house'). Thus this theme is often clustered with *Medium Switch* (see above) as SPAM was often used when other mediums were not available.

5 Simple technology supporting rich interactions

The technology installed at the setting described has basic functionality, yet supports rich, multi-layered interactions. In interaction terms, it presents a paradox: it is highly constrained in its input and output mechanisms, yet has many degrees of freedom (Laurel, 1991) with regard to how users exploit it. Yet despite these constraints, users rarely exploited 'textspeak' and were tolerant of one another's errors, even exploiting them as a source of fun and amusement. An additional paradox is the ephemeral, temporary nature of interaction (messages rarely stay on display for long) and its permanence due to its public nature. The specifics of messages rarely stayed in the memories of interactants for long (*History* was a minor sub-category), yet interactants developed an interaction style which was identifiable to others ('that has t be you [C] you tll crap jokes'). Finally, in the logs, there seems an inverse relationship between the length of the messages and their persistence over time. Frequent, short messages concerning seemingly trivial matters, such as what the latest football scores were, are illustrations that this 'simple' technology afforded interactions which were similar in nature to corridor conversations and impromptu meetings in a physical space: fleeting, lightweight and seemingly inconsequential yet essential for maintaining effective work practice.

These observations point to a willingness of interactants to engage in interaction using SPAM for reasons beyond moment-to-moment support for environmental constraints and organizational contingencies. A developing interest in this regard is how simple technologies impact on various notions of 'community'. It has become an accepted sociological dogma, one of the 'economies of signs and space' (Lash and Urry, 1994), that in the face of shifting and interconnected social, geographical and technical relations, new communications technologies allow for the use and maintenance of dispersed social networks. The interest here is in the boundary negotiations between real and virtual worlds; support for social rhythms; the emergence and development of community and the 'affordances' of the technologies used to support network communities. This paper considers some empirical features of 'community' in terms of what and how features of community might be technologically supported - looking in particular at issues of boundaries, relationships and change. The boundaries of community are not just spatial but also relational, social, technological, institutional. Our interest is in the working out - through the technology - of expectations and responsibilities, of reciprocity and commitment as well as shared values and practices. Joking and other forms of affective communication form an essential part of this. Our research is therefore interested in the extent to which the provision of various functionalities may prove useful in promoting or 'affording' some sense of community. For example, technology can reshape notions of space and proximity and thus the boundaries of 'community', reconceptualising what it means to be local, connected etc. However, there is no single, obvious, outcome of these technologies in terms of community.

6 Conclusion: 'A Man Went To See His Doctor With A Lettuce Leaf Poking Out of His Bum. "This Is Serious" Said The Doctor.."I'm Afraid Its Just The Tip of An Iceberg"'

"The mobilization of (technology) isn't really a technological process.. its cultural. The problem isn't to invent a machine, but to get us to adopt it, to feel that we need it. Because, of course, its we that need to be mobilized" (Myerson 2001)

Another (silly) joke from the everyday SMS messaging. Silly maybe, but it does point to other more serious issues; to how a technology becomes embedded in everyday practice. How technology becomes 'domesticated' or what Sacks (1992) would call 'at home in the world'. So whilst this paper is obviously not about microwaves, ducks or Bill Withers, or lettuces - in some strange way, it is. Our study points to how and in what ways any end product supporting community appears to be dependent on the interaction between the combination of technologies and their affordances and particular communities and their dynamics. Our contention here is that there is a temptation to over-design technology and add complexity to artefacts that sit on the periphery of 'work', supporting lightweight, yet essential, activity when such complexity and constraints may impede ongoing meaningful use. Thus in many settings, including those described here, the design problem is often more about addressing appropriate infrastructure needs and 'fronting' these with 'simple', lightweight interfaces supporting multi-layered, evolving interactions in everyday spaces. The research question posed here is then whether, how and in what ways the 'affordances' of such simple technologies provide new methods for forming and maintaining notions of 'community'. At issue are aspects of persistence, periodicity, boundaries, engagement and authoring. Getting the affordances to work requires (Mynatt et al., 1993) facilities for: membership and identity; representation; managing spatial relations; awareness of rhythms (Zerubavel, 1985); reliability and intelligibility. Finally, this research highlights a number of design issues for those concerned with communications technologies and 'community' - some are primarily technical, others are to do with developing guidelines. These might be delineated as: issues concerned with initial design; issues to do with designing and providing facilities for the maintenance of the community; and issues to do with enhancing the experience of the community.

References

Anderson, R.J., and Sharrock W.W (1993) 'Can organisations Afford Knowledge' Journal of Computer Supported Cooperative Work (JCSCW) Vol 1, No. 3, 143-161.

Cheverst, K., Clarke, K., Dewsbury, G., Hughes, J., Rouncefield, M., Crabtree, A., Hemmings, T. and Rodden, T. (2003b) "Designing with care: adapting cultural probes to inform design in sensitive settings", Proceedings of OZCHI 2003, pp. 4-13, Brisbane, Australia: Ergonomics Society of Australia.

Cheverst, K., Fitton, D., Rouncefield, M., and Graham. C.. 'Smart Mobs' and Technology Probes: Evaluating Texting at Work. In Proceedings of ECITE 2004.

Erickson, T., Kellogg, W., (2000) "Social Translucence – An Approach to Designing Systems that Support Social Processes" ACM Transactions in Computer-Human Interaction, Vol. 7 pp. 59-83

Fitzpatrick, G. Locales Framework: Understanding and Designing for Cooperative Work. PhD Thesis, Department of Computer Science & Electrical Engineering, The University of Queensland, 1998.

Glaser, B. & Strauss, A. (1967). The discovery of grounded theory: Strategies for qualitative research. New York. Aldine

Grinter, R.E. and Eldridge, M. (2001) y do tngrs luv 2 txt msg? In Proc. of ECSCW '01, Kluwer Academic Publishers.

Guba Y. and Lincoln E. (1989) Fourth Generation Evaluation, Sage Publications, USA.

Isaacs, E.A., Tang, J.C., and Morris, T.. Piazza: a desktop environment supporting impromptu and planned interactions. In Proceedings of the 1996 ACM conference on Computer supported cooperative work, pages 315–324. ACM Press, 1996.

Lash, S., and Urry, J.. Economies of Signs and Space. London: Sage, 1994.

Laurel, B, 1991. Computers as Theatre. Reading: Addison-Wesley.

McCarthy, J. (1993) Providing a Sense of Community with Ubiquitous Peripheral Displays, in: Public and Situated Displays: Social and Interactional aspects of shared display technologies. K. O'Hara, M. Perry, et al (Eds). Chapter 12, pp. 283-308, Kluwer. ISBN 1-4020-1677-8. 2003.

Mynatt , E., Adler , A., Ito , E.,. O'Day, V. (1997) Design for network communities, Proc.of SIGCHI conference on Human factors in computing systems (CHI), 210-217, 1997.

Myerson, G. (2001) *Heidegger, Habermas and the Mobile Phone*. Reading. Icon Books.

O'Hara, K. E. Churchill, M. Perry, D. Russell, N. A. Streitz, (2002) Public, Community and Situated Displays: Design, Use and Interaction around Shared Information Displays, www.appliancestudio.com/cscw/cscwdisplayworkshopcall.htm

Nardi, B., Whittaker, S. and Bradner, E. (2000) "Interaction and outeraction: instant messaging in action", Proceedings of the 2000 ACM Conference on Computer Supported Cooperative Work, 79-88, Philadelphia: ACM Press.

Perry, M., O'Hara, K., Sellen, A., Brown, B., and Harper, R. Dealing with Mobility: Understanding Access Anytime, Anywhere. ACM Transactions on Computer-Human Interaction, Vol. 8, No. 4, December 2001, Pages 323-347.

Sacks, H. (1992). Lectures on conversation. 2 vols. Edited by Gail Jefferson with introductions by Emanuel A. Schegloff. Oxford: Basil Blackwell

Tang, J.C., Isaacs, E.A., and Rua, M.. Supporting distributed groups with a montage of lightweight interactions. In Proceedings of the 1994 ACM conference on Computer supported cooperative work, pages 23–34. ACM Press, 1994.

Taylor, A.S. and Harper, R.. Age-old practices in the 'New World': A study of gift-giving between teenage mobile phone users. In Proceedings of the 2002 ACM conference on Computer supported cooperative work, pages 439-446. ACM Press, 2002.

Wellman, B. (1999): From Little Boxes to Loosely-Bounded Networks: The Privatization and Domestication of Community. In Sociology for the 21st Century: Continuities and Cutting Edges. J. Abu-Lughod ed. Chicago, IL: University of Chicago Press.

Whittaker, S., Frohlich, D., and Daly-Jones, O.. Informal Workplace Communication: What Is It Like and How Might We Support It? In Proceedings of the 1994 ACM conference on Computer supported cooperative work, pages 131-137. ACM Press, 1994.

Zerubavel, E (1985) 'Hidden Rhythms: schedules and calendars in social life. California. University of California Press