



Remote Homeplace Communication: What is it Like and How Might We Support It?

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We introduce the study of homeplace communication as being relevant to the design of new communication technology for the home market. After reviewing current approaches to the field, we go on to describe the nature of remote homeplace communication over the telephone, based on a quantitative and qualitative analysis of 315 household telephone calls. The findings are contrasted with aspects of workplace communication and used to identify 7 user requirements for support. We conclude with recommendations for future basic and applied research in the area.

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1. The homeplace communication challenge

In the future, a majority of homes in Europe and the US will be connected by broadband communication networks capable of carrying many times the amount of data which is currently transported over traditional telephone lines. This infrastructure will allow people to interactively exchange multimedia information on a personal, community and global scale using new kinds of computers, phones and appliances. The key question which hangs over such developments is a social rather than a technical one. In what ways would people find it useful to enhance and extend their everyday communication using the new technology?

Somewhat surprisingly there has been very little direct research into this question. Most effort in the technological community has been directed towards understanding user needs in *workplace communication*, since the primary market for computer and communications technology has been the workplace. Indeed, the field in which most of this research has taken place is called 'Computer Supported Cooperative Work' (CSCW); a name which indicates that the key problem situation of study is cooperative or group work (Bannon & Schmidt 1991). By default, many of the technologies developed out of this tradition are making their ways into personal and domestic contexts, through the use of small portable appliances such as mobile phones, pagers and organisers, and through the rise of home computers for telework and internet access. However it is unlikely that these tools and technologies will be ideally suited to the support of what might be called *homeplace communication*, where the problem situation may have more to do with the maintenance of relationships between family, friends and others, communicating within, to or from a household unit. What is really needed here is the equivalent of a CSCW-like research effort in homeplace communication, to identify the relevant behaviours and needs and so address the question outlined above. We might call this effort *Computer Supported Social Interaction* (CSSI).

In this paper we begin to characterize aspects of homeplace communication **as it is carried out today**, as a first step in identifying broad classes of user needs and technological requirements for further study in CSSI. The approach is similar to that taken in a previous publication characterizing informal workplace communication, and this paper can be read both as an extension and companion to that one (Whittaker, Frohlich & Daly-Jones 1994). For further information on the workplace study see also Frohlich (1995), Isaacs, Whittaker, Frohlich & O'Conaill (1997), O'Conaill & Frohlich (1995).

An alternative approach to the area is to examine the **uptake and use of new communication technologies** in a domestic context. Work on the home use of internet communication services is probably the most advanced of this kind, and should be seen as complementing the picture we are about to present (e.g. Kraut, Scherlis, Mukhopadhyay, Manning & Kiesler 1996, Rhiengold 1995, Turkle 1995).

2. Building on previous work in homeplace communication

A detailed understanding of how people organize their domestic communication activities is not available from the scientific literature. Several fields of research intersect the topic without providing the necessary level of insight to reason about requirements for technological support. Family Studies have examined the changing pattern of family

composition and relationships in different societies, without going into the details of everyday communication patterns (e.g. Burguiere, Klapisch - Zuber, Segalen & Zonabend 1996). Time Use studies describe the allocation of personal time to several communication-related activities, but fail to specify what happens within those periods (e.g. Robinson 1988). Conversation Analysis (CA) utilizes complete recordings of naturally occurring conversations to examine micro-conversational practices, but has generally overlooked the ways in which conversations between the same partners are themselves strung together over time (c.f. Frohlich 1994). Finally, the Social and Personal Relationships literature recognizes the importance of routine interactions in relationship maintenance, but has so far failed to examine them directly (c.f. Duck & Pittman 1994).

Research in this latter area is probably the most revealing of potential problems in homeplace communication. One big problem is that all relationships appear to require maintenance through contact, but that this becomes increasingly difficult over the years as local friends and family move away from each other (Dickens & Perlman 1981). People tend to protect family ties at the expense of friendships which don't carry the same sense of obligation; resulting in the common experience of always 'being there' but 'growing apart' (Rawlins 1994). Social trends towards higher divorce and separation rates exacerbate the problem for shared friendships, and have serious consequences for the relationships between children and their absent fathers and paternal grandparents (Bengtson & Robertson 1985).

In order to address the lack of observational data on homeplace communication, we decided to examine use of the domestic telephone through analysis of an existing corpus of calls. By examining the content as well as the pattern of telephone calls in the corpus we go beyond existing studies of telephone use (e.g. de Sola Pool 1977) and extend CA methods to the study of social and personal relationships. In this way we have chosen to characterize *remote* homeplace communication as it is done today over the phone, and so investigate the problem of remote relationship maintenance in its practical context.

3. Methods

We had available a particularly suitable corpus of telephone calls recorded by one family over a three year period. The family live in the south of England, and consist of a husband (Skip) and wife (Lesley), and their two children (Kath and Gordon). Note that all parties in the calls are identified throughout by pseudonyms to preserve their anonymity, and all other identifying details have been changed on transcripts of calls. They can be classified as professional middle class; Skip working in the financial management of a machinery company, and Lesley being a supply teacher. Kath is at university in the north of England, and Gordon is finishing A' levels (in the latter part of the 3-year period over which recordings were made, he also has left to go to university). They have not always lived at their current address, and so have family and friends in other quite distant parts of the country. For instance, the wife's mother lives approximately 150 miles away; although the husband's mother lives close by, in the same town. The family, and in particular Lesley, is affiliated to a number of church and other local organizations.

Recordings were not continuous over the 3 year period: instead they were made at intervals - in the weeks before Christmas in the first year, for short periods during most months in the second year, and in May and then September/October in the third year. So

that the corpus is a sample of the calls made by and to this family over 3 years; but in the periods sampled, all outgoing calls made by members of the family and incoming calls were recorded by a remote recording device. This resulted in a sample of 315 calls, totaling 22 hours of telephone conversations.

The conventional CA approach to these recordings would be to transcribe a sample of the calls so as to gain a better understanding of the kinds of social phenomena they contain, and then to collect multiple instances of some target phenomenon as a preliminary to looking at how it works. Indeed about a third of calls in this corpus have been transcribed in detail using conventional CA notation (c.f. Atkinson & Heritage 1984). In this analysis we supplemented this approach with an encoding of various properties of each interaction in the corpus such as who was calling who, about what and for how long. This allowed us to explore certain macro patterns in the data relating to the whole household's use of the telephone, and to pinpoint important phenomena at this level for more detailed collection and analysis.

The following characteristics were coded for each call: caller identity; identities of answerer, the intended recipient of the call, and others who may have participated in the conversation; relationships between caller/receiver etc.; duration; reason for call; principal topic(s) discussed; whether messages were taken during the call; local or long distance; whether the call was connected to some prior contact between participants, including whether it was pre-arranged; whether the call was one in a series (eg. 'phoning around a group of people about some event); whether explicit reference was made to some physical materials, or environment; and the approximate time of day, and whether weekday or weekend.

In what follows, we try to illustrate some of the macro quantitative patterns which emerged from the data, with brief excerpts from the transcripts. Our aim is to give some flavour of the nature of remote homeplace communication as embodied in the corpus, through a mix of quantitative and qualitative analyses.

4. Understanding remote homeplace communication

4.1 The nature of calls

We found that calls in the corpus were essentially of two broad types. Of the 315 calls made, 166 (53%) were **single-topic calls** made with the express purpose of discussing the original reason for calling. Another 146 calls (46%) were **multiple topic calls** in which the reason for calling formed only one of a number of topics discussed. (A further 3 calls could not be classified as single or multiple topic because their recording was cut off before the end of the first topic). Extracts 1 and 2 below illustrate each type, and serve to give a flavour of the kinds of calls recorded.

Extract 1. A content-oriented single topic call (C258)

GORDON HAS JUST FORGOTTEN TO ATTEND A HAIRDRESSERS APPOINTMENT EARLIER IN THE EVENING.

1. Gordon: Hello:,
2. (0.3)
3. Desk: Hello is Gordon the[:re
4. Gordon: [mptch e-speaking,

5. Desk: Um (0.4) it's the hai:r dresser's. And eh you had'n
6. appointment for: (0.5) tonight at at six thirty:
7. (.)
8. Gordon: Ah yes I di-:d that's right.h · hh (.)
10. Gordon: I forgot completely about it
11. (1.1)
12. Desk: Oka:y,

Extract 1 shows the opening of a brief call to Gordon by his hairdresser to remind him that he just forgotten his appointment (to Line 6). In the remainder of the call (not shown) Gordon responds by apologizing and then arranging a new appointment, and the call is closed after a total of 50 seconds without any talk on other matters. Note that the focus here is on the content of the talk.

In contrast, Extract 2 shows the opening of a regular weekly call that Lesley has with her mum. Each of them take it in turns to call the other on alternate weeks and this call begins with mum explaining why she is ringing on Saturday evening when it was Lesley's turn to call the following day (Lines 5, 7 & 8). Lesley doesn't wait for her mum to provide any further reason for calling than this, and goes on to broach a new topic in Line 9 by remarking on the snowy weather. This then becomes the second of 10 topics discussed over the next 4 minutes 41 seconds before the recording ends prematurely. The usual duration of these calls is 10 minutes 16 seconds. The fact that Lesley's mum has no particular reason for calling other than to chat to her daughter, captures the spirit of a number of calls in the corpus which seem to have as their function, just talking to the other party. In contrast to the content-focussed nature of single topic calls, the focus here is on the relationship between the talkers; where the talk is used to maintain and extend the relationship itself.

Extract 2. A relationship-oriented multi-topic call (C30)

LESLEY AND HER MOTHER TAKE IT IN TURNS TO RING EACH OTHER ON SUNDAY EVENINGS. IT IS LESLEY'S TURN TO RING ON THE SUNDAY BUT HER MOTHER OPTS TO RING ON THE SATURDAY EVENING INSTEAD. THE FIRST FEW TURNS ARE NOT SHOWN.

1. Lesley: How are you:?
2. Mum: Oh fine thanks love,
3. Lesley: .hh [I w'z go]ing tuh ring you t'morrow ni:ght.=
4. Mum: [And you?]
5. Mum: =Oh:. Well I-: I'm (.) go to church t'morrow evening,
6. Lesley: Ye[s,
7. Mum: [So I thought I ring you this evening. I haven't been: going in the evening b't

8. I'm going t'start t'morrow
9. Lesley: Oh:- You know we had snow this evening,
10. Mum: So did we:.

In actuality, Extract 2 seems to lie at the extreme end of a continuum within the multi-topic calls, which vary in their content versus relationship focus. A more content-oriented call which contains two topics is shown in Extract 3. Here Lesley calls the father (Arthur) of a friend of Kath's, Clive. She asks him to tell Clive that Kath is coming home on Sunday and would like to see Clive on Monday. After Arthur agrees to pass on the message he takes the opportunity of asking about the recent burglary at Lesley's home (Line 9). In this way a purely content-oriented call that might have taken 36 seconds, turns into a relationship-oriented one lasting 1 minute 26 seconds.

Extract 3. An extended content-oriented call (C212)

LESLEY PHONES ARTHUR, THE FATHER OF A FRIEND OF KATH TO ASK HIM TO PASS ON A MESSAGE TO HIS SON CLIVE. ARTHUR AGREES AND GOES ON TO ASK ABOUT LESLEY'S RECENT BURGLARY

1. Lesley: [We're going t'this Fest'val'v Nine Lessons 'n Carols (0.2) Sundee evening ·hh but she said
2. i-uh:-(0.2) tih (0.2) tell Clive to wander rou:nd or she'll wander round,h (.) an' meet him
3. (0.3)
4. Arthur: iYes[okay
5. [uh:m: (0.3) Mondee sometime
6. Arthur: Right that's fi:ne.
7. (.)
8. Lesley: i[Yes
9. Arthur: [o-Okay I'll d_o that. .hhh (0.2) How h_ow've you settled in now after the: (p) visitor.
10. (0.2)
11. Lesley: ·hhh Oh: (.) eh hheh he hh Well- (0.2) h (.) I mus' say this finger print stuff makes a me:ss but
12. Arthur: Oh:.
13. Lesley: An' I can' get the mud off the cushion: but apart f'm that we're alri:gh[t?
14. Arthur: [What a nuisance.

These three examples also illustrate a broader trend in the relationship between partners holding single-topic and multiple-topic conversations. Multiple-topic calls like Extracts 2 and 3 are largely between the family and friends of the household, whereas single-topic calls like Extract 1 are largely between friends or those we have classified as 'others'; including work colleagues, domestic business contacts (e.g. hairdresser), neighbourhood contacts and strangers. In this respect, the quantitative data reinforces the ambivalent nature of calls between friends, since these are the calls where the number of topics are

most unpredictable (see again Extract 3). This pattern is shown in Table 1 and is significant at the .0001 level ($X^2=74.01$, $df=2$).

CALL PROPERTY	FAMILY	FRIEND	OTHER	TOTAL
Single-topic calls	29.00	65.00	72.00	166.00
Multiple-topic calls	69.00	72.00	5.00	146.00
TOTAL	98.00	137.00	77.00	312.00

Table 1. The number of single and multiple-topic calls made by family, friends and others.

Other attributes of the calls between family, friends and others are shown in Table 2 and reveal further comparative differences in communication. It should be noted that these statistics apply to individual interactions rather than calls, since early in the coding process we discovered that the corpus contains 61 *multi-interaction calls* in which several two party conversations take place. Since the attributes of these calls cannot clearly be coded at the call level, we switched to coding individual interactions in the corpus as a more meaningful unit of analysis; and Table 2 reports some of the key details of what we found. It is based on a total of 384 interactions made within the 315 calls. The phenomenon of multi-interaction calls is an important finding in its own right and is explored in further detail later.

INTERACTION PROPERTY	FAMILY	FRIEND	OTHER	TOTAL
Mean duration of completed interactions (min:sec)	4:43	4:01	1:67	–
Total number of Interactions	116	169	99	384.00
...of which: Scheduled	36	22	4	62.00
...of which: Incoming	70	73	27	170.00
...of which: Local	32	143	86	261.00
Total number of messages	33.00	54.00	13	100.00
References to local documents	59	46	29	134.00
References to local objects/scenes	354.00	237.00	79	670.00

Table 2. A summary of some key properties of household telephone interactions by relationship.

Taken together, the findings of Table 2 suggests that remote homeplace communication has some quite different properties to informal workplace communication as revealed in

our earlier study (Whittaker et al 1994). In general, interactions with 'others' have the most business-like quality in the sense that they are more likely to be single-topic, they last about 2 minutes, and they tend *not* to be scheduled in advance. However, even these have some new features. For example many of them are one-off outgoing calls to shops or service organizations, most of them are local, and they involve about half the number of references to documents you might expect in a work context. In contrast they involve a large number of references to local physical objects and scenery. While this latter feature wasn't something we examined formally in the workplace, our sense is that references to the local physical surroundings are more pervasive and important in the home context.

The greatest differences between home and work interactions are revealed in our household's interactions with family and friends. These interactions are twice as long (4 minutes instead of 2), more likely to be scheduled in advance, involve even more references to 'domestic scenery', and contain a large number of messages for third parties. Furthermore, family and friend interactions themselves differ along some of these dimensions. Interactions with family tend to be longer, involving more references to documents *and* objects, to more long distance destinations, but with fewer messages.

In the following sub-sections we explore the most distinctive features of the corpus revealed by this analysis; including the scheduling of calls, the occurrence of multi-interaction calls, the exchange of messages, and the mentioning of domestic scenery.

4.2 Scheduling and initiation

In our earlier workplace study we found that only 5 out of 108 business phone calls (i.e. about 5%) were time or date scheduled in advance (unpublished data). In the current study we see the same low level of scheduling reflected in the interactions with 'others' (4%) but much higher levels of scheduling in interactions with friends (13%) and family (31%).

A major motivation for the higher incidence of scheduling in calls to family and friends is that there is simply less time when these contacts are likely to be mutually available to each other *without* scheduling. Interactions in the corpus took place most often on weekday evenings (38%) or at weekends (37%) - based on 266 interactions whose time and day could be identified. Given that family members share the phone and pursue a range of activities outside the home, the chances of getting through to an intended party spontaneously are slim. With scheduling however, callers in this corpus were able to achieve a successful connection up to 89% of the time - not counting engaged or unanswered calls which were unrecorded. This compares with a hit rate of 38% in the workplace context - where calls usually get answered by someone (Whittaker et al 1994).

A related finding was that pairs of family members often fell into a routine of regularly calling at certain times of the week. The best examples of this were the conversations between Lesley and her mum every Sunday evening. These calls were so regular that any deviation from the normal time of calling was accountable by the violating party (see again Extract 2). Other examples of regular family calls were Skip calling Lesley from work during the day and Kath ringing at the end of University terms to make arrangements for coming home.

In contrast, contact between friends was rarely scheduled and usually prompted by a specific reason for calling. Local calls between friends often arose out of prior face-to-face contact or were concerned with arrangements to meet. Although there was evidence of regular contact between local friends, such as Gordon and his girlfriend, the only regular long distance friendship calls were those prompted by events such as Christmas and birthdays. These events seemed to be used as an excuse to get back in touch.

We see this pattern as being dangerous for the maintenance of long distance friendships over the phone, which lack the kind of ongoing local encounters which trigger calls. In these cases it seems to take some sort of shareable experience, event or concrete object to invoke the relationship again and trigger the call. A good example of this is shown in Extract 4. In this case Lesley receives a holiday postcard from Anna, an old friend of hers now living on the South coast. Lesley responds to the postcard by ringing Anna that same day to thank her and re-establish contact. Note the measured tone of the opening questions by Lesley to check that the postcard was indeed from Anna (Line 8), and her reinforcement of shared experience with Anna by bringing in the connection with Kath's interest in the holiday destination (Line 14).

Extract 4. Getting back in touch with a friend (C289)

A HOLIDAY POSTCARD FROM AN OLD FRIEND OF LESLEY'S TRIGGERS A FOLLOW-UP TELEPHONE CALL

1. Lesley: Oh hello (0.3) is that Anna?
2. Anna: Yes speaking
3. Lesley: Oh hello Anna (0.4) er- this is Lesley Field here
4. (0.9)
5. Anna: ↑OH LESLEY!
6. Lesley: Yes hello
7. Anna: He↓llo:
8. Lesley: ↑Did we get a post↓card from you today from the Isle of Arran
9. Anna: Yeah you did
10. Lesley: OH! (0.2) HOW LOVELY!

11. Anna: ha ha ha ha ha
12. Lesley: Were you havin holiday the::re
13. Anna: Ye::ah!
14. Lesley: OH GREAT! (0.3) only Kath- its Kath's favourite stamping ground
15. Anna: Its not

4.3 Multi-interaction calls

The occurrence of multi-interaction calls in the corpus is related to the fact that the household telephone is a *shared resource*, and that it is often used to communicate with *common contacts*.

An example of a multi-interaction call stemming from the first factor is one in which the caller gets through to someone who is not the intended recipient of the call, and they in turn pass the phone over to the intended party. Fifty of the 61 multi-interaction calls (i.e. 82%) were of this type. Many such calls resulted from the fact that in this household, father, mother and son effectively compete to answer the phone. The equivalent format in the workplace is a call to a receptionist or colleague who subsequently passes the caller to the 'appropriate person'. Indeed we encounter a small number of these calls themselves in the household corpus as Lesley, Skip, Gordon and Kath phone *out* on domestic business calls, or contact friends and family at work. An interesting difference between the two formats is that when family members answer the phone on behalf of other members, they often strike up their own conversation with the calling party. This happened once in every three calls of this type. It was particularly common in Lesley's interactions with friends of her children calling in. She uses the opportunity of taking a 'missed connection' to Gordon or Kath to consolidate her relationship with them!

The remaining 11 multi-interaction calls are instances of the phone being passed around members of a household opportunistically. In these cases there has usually been a successful connection between the original calling and called parties, who then go on to engineer other connections with common contacts at either end. For example in one call, Lesley speaks to her mum for 2 minutes 33 seconds before passing her onto Gordon for 36 seconds. The transition is shown in Extract 5 below. In the rest of the call (not shown), Lesley resumes conversation with her mum for a further 1 minute 24 seconds. Her mum then hands over to 'Auntie Vanna' at the other end (for 2 minutes 12 seconds) who happens to be visiting her at the time. The phone finally returns to Lesley's mum who closes the call after a further 1 minute 19 seconds.

Extract 5. Passing the phone around (C266)

MUM HAS CALLED LESLEY FOR THEIR ROUTINE WEEKLY CHAT AND DURING THE COURSE OF THE PRECEDING CONVERSATION LESLEY REPORTS THAT GORDON HAS JUST ARRIVED HOME FROM AN ALL NIGHT PARTY. GORDON'S SUBSEQUENT INTERACTION WITH HIS GRANDMOTHER IS SEEMINGLY OCCASIONED BY HIS OPPORTUNE AND NOISY ENTRANCE.

1. Mum: M[m:.
2. Lesley: [.hhhh No. We- uh[we feel that when we come t'you we'd=
3. [((noise))
4. Lesley: =like (.) just have a rest u- Oh say hello to .hhh Granny Anders.
5. (0.3)
6. Gordon: Hello:.hmhhh
7. Mum: Hello:: ((mimicking his greeting))
8. (.)
9. Mum: Have yih hadda nice ti:me,

A variation on actually passing the phone around is to have a third party listening into one half of the conversation and chipping in comments. Extract 6 shows an example of this in which Skip's niece shouts out a question to him (in Line 4) while he is talking to her dad. Again, this occurs because members of the household at one end share some friendship or family relationship with someone at the other end, and become involved in the call largely by virtue of their proximity to the phone.

Extract 6. A third party trying to get in (C233)

SKIP HAS TRIED TO CALL HIS SISTER. SHE IS OUT SO THE ANSWERER, HIS NIECE DIERDRE, PASSES HIM ON TO HER DAD, DWAYNE. DWAYNE'S FAMILY ARE JUST FINISHING THEIR TEA AND ARE ASSEMBLED IN CLOSE PROXIMITY TO THE PHONE.

1. Dwayne: Oh: lovely. Funny e[nough Deena[wz only (.) talking=
2. Skip: [.hhh [whh.
3. Dwayne: =a[bout you the other day]
4. Dierdre: [You coming to my weddi::n?
5. Skip: .hhhh
6. (0.6)
7. Dwayne: dihyuh hear that,
8. Skip: gihYeah I heard that that's why I rang up really

A final point to note is that we found some evidence of a tension between the shared and the private use of the phone in these circumstances. This is exemplified in Extract 6 in which Kath's ex-boyfriend Miles calls to speak to Kath who is out. He subsequently refuses to leave a message for Kath with Lesley (Line 5), suggesting that there are aspects to his relationship with Kath that he would rather keep private. Actually doing this turns

out to be a perennial problem with the family phone which is often used in a very public context, and via people who will naturally want to take a personal interest in each other's relationships.

Extract 7. Evidence of a private relationship (C26)

KATH'S EX-BOYFRIEND MILES RINGS TO SPEAK TO KATH BUT GETS HER MUM INSTEAD. LESLEY OFFERS TO TAKE A MESSAGE BUT MILES DECLINES.

1. Lesley: O[o d'you wan't'give me a m e s s A] G E,
2. Miles: [D'y'know w't time s h e 'll be in.]
3. Miles: Pardon?
4. Lesley: D'you want t'give me a messAGE.
5. Miles: Oh no I better ring'er back myse:lf,

4.4 Exchanging messages

The passing of messages to third parties occurred in one out of every four interactions in the corpus. It occurred even more frequently as a proportion of interactions to family and friends; with one in three calls to friends containing a message (see again Table 2).

Exchanging messages was common in the workplace context also, although there it was usually done following a 'missed connection' event to pass on a message to the missing party (Frohlich 1995). Here we found that this kind of message accounted for only 28% of the total number of messages exchanged. The other 72% of messages involved the passage of information to some mutual contact of two people who had successfully established contact with each other.

An example of this second type of message exchange is shown in Extract 8. Kath is expecting to come home from University soon and calls Lesley to make arrangements. In the course of their conversation Lesley relays a message from a local friend of Kath's, Harriet, who has apparently asked for her to come home as soon as possible (see Line 1). As often happens in these situations, the message recipient, Kath, is able to construct her reply as a further message which Lesley is asked to pass back to Harriet (Line 6). This example also shows that some of these 'messages' may actually be rhetorical devices for the speaker to indicate the feelings or intentions of mutual contacts whether or not they have been voiced as such. Here Lesley may not be reporting words which Harriet has uttered, so much as her belief that Harriet misses Kath and would benefit from her contact.

Extract 8. Multiple message relay between successfully connected speakers (C196)

A MESSAGE FROM HARRIET IS RELAYED FROM LESLEY TO KATH AT THE END OF A CALL TO ARRANGE WHEN KATH IS COMING HOME FROM UNIVERSITY. KATH IMMEDIATELY ASKS LESLEY TO PASS ON HER REPLY.

1. Lesley: .hh Oh Harriet says please come home as soon as possible and she looks really:: washed out
2. Kath: Does she oh::
3. Lesley: I expect really its a bit traumatic at home at the moment ['cos
4. Kath: [()
5. Lesley: I know erhm (.) Norman's a bit cut up and I think Jean is too
6. Kath: Erh ye::ah tell her I'll be home soon anyway.

The practical effect of these messages is to extend the range of one's social network and to create some sense of a 'community' of mutual contacts. Both points are illustrated in Extract 9 taken from the same call as Extract 8. Lesley passes on advice to a friend of Kath's that she doesn't really know, following a stretch of talk discussing her back condition (Lines 1 and 8).

Extract 9. Advice to a friend of the family (C196)

LESLEY AND KATH ARE DISCUSSING THE BACK CONDITION OF FRIEND OF KATH'S. LESLEY INSTRUCTS KATH TO PASS ON SOME ADVICE.

1. Lesley: Tell her to lie on the floor as much as possible.
2. (1.1)
3. Kath: Yes I wonder if her bed[']s
4. Lesley: [Sorry?
5. Kath: I wonder if her bed's is: (.) uhm (0.3) hard enough
6. Lesley: No her bed may not be may it
7. Kath: No
8. Lesley: ↑Tell her to put a be- erhm a board of some kind or an old door (.) under [the
9. Kath: [Yeah
10. Lesley: Under the bed

4.5 References to domestic scenery

A final distinctive feature of the corpus was the large number of references to local physical materials. On average, such references were made twice in each interaction. This compares with one document reference in every two own-office conversations in our workplace corpus (Whittaker et al 1994). Document references were also important in the homeplace context; occurring in 35% of interactions. However, by far the most common type of reference was to parts of a local domestic scene.

Extract 10 shows how such references are used. Lesley has phoned Joan who is a friend of hers, to thank her for buying her a table decoration at her request. When Lesley tries to

not be read as product recommendations but as technology areas for further research and development.

Single-topic calls between friends and others actually made up the majority of calls in the corpus. These kinds of short business-like interactions are not what we might ordinarily think homeplace conversations are like, nor are they likely to be the kind of calls that people themselves will attach much significance to in interviews about their communication and relationships. Nevertheless we should not forget them in our haste to support the more 'important' aspects of home communication, as happened in the workplace context until relatively recently (Kraut, Fish, Root & Chalfonte 1990). Since the single-topic homeplace calls have much in common with informal workplace communications, they may benefit from the same kinds of support applicable to that area (Isaacs et al 1997). In particular, we feel that the use of convenient lightweight messaging facilities such as voicemail, two-way paging, and handwritten (scribble) email would allow household members to make many of their practical arrangements with each other more quickly and efficiently, without having to ring round, ring back or tie up the phone from others. The rapid uptake of paging technology in the US seems to confirm this view, as does the growing use of text-based email for social contact. The same technology might also be used to pass messages directly to third parties, which would normally go through intermediaries.

A further user requirement for single-topic calls arises from the special problem of sharing a household telephone. Very brief and purposeful calls are often thwarted by the caller getting through to the wrong person and then falling into conversation with the answerer. This situation might be changed by routing incoming calls to the right person. This might be done by using caller id. information in conjunction with an on-line household phone book or 'called id.' information elicited from the caller, to route calls to individually addressable handsets. Alternatively, the same information might be used to change the ringing tone of a single phone. This technology can be seen as satisfying part of a more general need for increasing the privacy of certain calls to friends and others. In short, single-topic interactions would benefit from:

- *Lightweight messaging*
- *Incoming call routing*
- *Increased call privacy*

Multi-topic calls between family and friends, were the other major class of calls. These seem to have somewhat different sets of requirements to the business-like calls as can be seen from the findings on scheduling, calling distant friends and passing round the phone. Making prior arrangements to call was relatively common and might be supported by

some kind of phone-based diary facilities. These could take the form of a phone booking system showing who is planning to call in and out from a given phone at any time, a household diary system to allow plans to be made in the context of other household members, or a personal diary system showing the social plans of individual household members. Obviously some of these options have broader benefits than the support of call scheduling, such as supporting the making of arrangements of all kinds and synchronizing joint household activities. Further care should be taken to integrate this support with existing practices and tools for personal time management.

Regarding the contact between distant friends, we believe that messaging technology might again be used to increase the frequency of mundane contact and provide triggers for replies and follow-up calls. The concept of an audiopostcard comprising a recent photograph with a voice message attached is a good example of what we mean by this, since it is a vehicle for friends to exchange details of recent life events which can then become something they can talk about. Another example is a magazine cutting or cartoon which might be sent to a friend electronically using the fax or its component technologies, as an item of interest showing that one party was thinking of the other.

Finally, the practices of passing the phone around and chipping into someone else's call suggest the need to open up the two party phone-call at one or both ends. Note that this is the exact opposite of increasing call privacy, since its aim is to make the call more public and sharable by several people at the same location. Current speaker-phone technology goes some way towards this, but might be extended to include some visual context for the call, provided through a video or live photo link (see below). In short, multi-topic calls would benefit from:

- *Phone-based diary facilities*
- *Message triggers for talk*
- *Increased call 'sharability'*

A user requirement which has emerged as important to **both single and multi-topic calls** is the sharing of a local speaker's viewpoint with the other party. This relates to the large number of references to domestic scenery and objects which might be enhanced by the speaker being able to introduce his or her current viewpoint into the conversation for both parties to talk about. This might be done by adapting current videoconferencing technology to support viewpoint capture with a portable camera, handset or headset, coupled to a display at the other end of the telephone line. We believe this arrangement would overcome many popular reservations with the videophone revealing too much about themselves or their surroundings, by giving people fine control of exactly what details they share, when and with whom. The same technology might also be used

asynchronously to record, send and review audio and videopostcards. To reiterate then, all remote homeplace communications might benefit from:

- *Viewpoint transmission*

6. Future research

All the above requirements constitute areas for future research in CSSI. Care should be taken to evaluate the subjective as well as the objective effects of these technologies on each member of the household, since we have found evidence of conflicting user needs and preferences which do not necessarily correspond to communication 'efficiencies'. For example, we are concerned about the side effect of increasing call privacy by routing incoming calls directly to their intended recipients, even though this appears to have obvious benefits to the calling and called parties. This solution reduces the opportunity for members of the household to get to know each others' friends and acquaintances, and therefore play a mediating role in these relationships - an effect which is likely to be most unpopular with parents. The dilemma is reminiscent of one faced by some teleworkers who become more productive for working 'off-site', at the expense of being connected to the day-to-day activities of their on-site colleagues through monitoring, helping and mediating behaviours (O'Conaill & Loughran 1997).

Further basic research into homeplace communication could proceed in a number of directions from the current study. First, we hope to deepen the current analysis by looking at how some of the more significant phenomena work in detail across the corpus. Second, our initial findings need to be validated and extended using the same methods with other families, or by using larger scale research methods. Third, a more complete picture of remote homeplace communications could be provided by recording all forms of household communication at a distance, including correspondence as well as telephone calls. From here it would be a short step to researching homeplace communication in general, by recording the course of face-to-face interactions with visitors to the home, and with other household members. All these approaches might benefit from the mix of quantitative and qualitative analysis we have employed in this study, and from the ability to compare accounts of communication behaviour with actual practices.

7. Summary & conclusions

We have found that remote homeplace communication assumes two basic forms: single-topic calls to friends and others, and multi-topic calls to friends and family. Single-topic calls have a business-like quality and might benefit from the same kinds of support targetted at informal workplace communications, such as lightweight messaging. The added complication of making such calls over a shared household telephone line also suggests a need for incoming call routing and greater call privacy. Multi-topic calls,

although often triggered by specific reasons for calling, have more of a recreational character, in which conversation is entered into for its own sake as part and parcel of maintaining the relationship between speakers. These calls would benefit from integrated diary facilities for call scheduling, asynchronous triggers for talk, and greater call sharability. The transmission of current speaker viewpoint would benefit both types of calls which involve extensive references to local domestic scenery. Future research should attempt to validate and extend these findings, and to develop technology satisfying each requirement.

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