Entertaining situated messaging at home

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Abstract. Leisure and entertainment-based computing has been traditionally associated with interactive entertainment media and game playing, yet the forms of engagement offered by these technologies only support a small part of how we act when we are *at* leisure. In this paper, we move away from the paradigm of leisure technology as computer-based entertainment consumption, and towards a broader view of leisure computing. This perspective is more in line with our everyday experience of leisure as an embodied, everyday accomplishment in which people artfully employ the everyday resources in the world around them in carrying out their daily lives outside of work. We develop this extended notion of leisure using data from a field study of domestic communication focusing on asynchronous and situated messaging to explore some of these issues, and develop these findings towards design implications for leisure technologies. Central to our discussion on the normal, everyday and occasioned conduct of leisure lie the notions of playfulness and creativity, the interweaving of the worlds of work and leisure, and in the creation of embodied displays of affect, all of which may be seen manifested in the use of messaging artefacts. This view of technology in support of leisure-in-the-broad is strongly divergent from traditional entertainment computing models in its coupling of the mechanics of the organisation of everyday life to the ways that we make entertainment for ourselves. This recognition allows us to draw specific implications for domestic situated messaging technologies, but also more generally for technology design by tying activities that we tend to regard as purely functional to other multifaceted and leisure-related purposes.

Keywords. Communication, domestic computing, ludic computing, playfulness, shared displays, situated messaging.

1. Situating leisure technologies in the home

1.1 On leisure

Our homes are the places that most of us spend a very large proportion, if not the majority, of our leisure time (Kelly, 1997). It would seem that these are important sites for the study of how leisure is conducted and the use of leisure technologies, as well as for the support of leisure in developing technologies. This observation forms the context for this paper, taking the home as a focus for investigation in our study of leisure and the design of leisure technologies.

Over the course of this paper we attempt to re-examine the nature of leisure so that we may better support it through the development of leisure technologies. We take the position that leisure is often too narrowly defined within the design community as a highly dedicated and focussed activity (examples of this are numerous, e.g. O'Brien *et al.*, 1999; Benford, 2000; Mueller *et al.*, 2003; Brunnberg, 2004; Reid *et al.*,

2004), enacted through game playing or media consumption (often using what we have come to call 'entertainment technologies'), when in practice, it is much more subtle and diffuse than this. Even when leisure technologies are discussed within a wider range of activities, these technologies are often disconnected from the broader context in which leisure takes place, and tend to be focussed around a particular activity in a non-work setting, rather than dealing with the notion of leisure directly (e.g. Weilenmann and Larsson, 2001; Taylor and Harper, 2002; Vetere *et al.,* 2005). Although we have personally found this work extremely valuable, we need to recognise that leisure encompasses a far broader set of circumstances, relations and practices than these studies have represented to date for CSCW, and intend to complement this existing body of research with an alternative perspective on leisure and leisure technologies. We posit that a restricted perspective on the constitution of leisure has had an impact on framing the arguments and the language used within the technology-studies and design communities. Furthermore, we argue that this has given rise to technologies which are constrained to a relatively small subset of functions that are generally not representative of the broad set of activities that people engage in when they are at leisure.

When we speak about leisure technologies, it is important to clarify what we mean by the term 'leisure' before rushing to fill this apparent gap in our lives with technology. Leisure, then, is commonly described as antithetical to work, and as taking place during free, or spare, time (e.g. Nippert Eng, 1996). It is generally associated with recreation, relaxation or pleasure, and is also commonly coupled with reference to unhurried activity ('at your leisure') and general idleness (Oxford English Dictionary). Although there have been some problems in defining leisure (e.g. Roberts, 1999), in everyday use we commonly associate it with the evening, weekends or holidays and involving life at home, with friends or travelling, in direct opposition to working hours or the working week. This somewhat obvious treatment of the term is curiously not evident in the current computer-based technologies and interactive media experiences that seem to define the literature on leisure and entertainment computing, typically as gaming or audio-visual media consumption, and narrows the perspective of what leisure and the utilisation of leisure technologies might involve in the home. Interestingly, this view of leisure appears to be largely limited to the computing literature and computer industry rhetoric. Outside of these areas, more diverse perspectives on the nature of leisure can be seen, such as Gelber's (1999) analysis of hobbies as 'productive leisure' and their role in home life, or Shannon's (2006) studies of leisure in unstructured activities that provide an opportunity for pleasure and enjoyment.

Certainly, leisure may involve actively engaged fun – the perspective that technology developers and media content providers have typically taken, but it is not exclusively about fun, excitement, engagement or action. Problematically for design, leisure has even been characterised as sometimes involving *inactivity* – a real challenge to technology developers wishing to impose on us new tools to occupy our (clearly underused) time. Even accounting for its broadening of definition, this more reflective view of leisure is not

an area that has been well served by recent computer-based developments. Of course, we may be able to while away the hours playing solitaire, keep up with remote family members through computer-based methods of communication, or vegetate in front of the television with any number of media viewing formats, but these technologies are not the inevitable or exclusive outcome of designing to support leisurely activity. We therefore begin our examination of leisure and leisure technology by reviewing what the nature of leisure is, how leisure is spent, and only then attempt to identify what leisure technologies might involve within a home environment. This discussion is developed through an examination of asynchronous messaging within a domestic setting, allowing us to explore some of the sociable, emotional and playful aspects of leisure communication that are typically, although perhaps unfairly, excluded from studies of leisure technology.

1.2 Leisure and entertainment technologies

Leisure and entertainment form a large component part of most people's everyday activities and we regularly and unproblematically engage in and understand them without reference to computer-based or audio-visual media. It is a commonplace observation to see that we manage to entertain ourselves well enough simply without requiring formally structured, or rich and highly interactive media. Yet the current embodiment of leisure technology is typically framed as a vehicle for entertainment, through televisual (for example as satellite television, VCRs, DVRs, DVDs) and other audiovisual media (such as music listening), or immersive gaming systems (e.g. Playstation, Xbox, Gameboy, handheld computer or PC). As we move away from these traditional notions of leisure computing, or more specifically of computing in the entertainment *industry*, we can begin to lose our preconceptions of leisure time as something that needs to be filled, typically with highly engaged play. Simple examples of this in the computing literature can be seen in the role that the viewing and sharing of photographs, shared listening to music, cooking or visiting of a zoo can play in the social life of the family (see other papers in this issue; O'Hara and Brown, 2005; Terrenghi *et al.*, in press); these are complex activities that unfold over time and may themselves be interwoven within other activities. It is within this everyday social context that we position our argument here and seek to examine what people do when entertaining themselves by uncovering the leisure activities and practices that they engage in.

Within HCI and CSCW, studies of human activity and communication have tended to focus on improving the effectiveness of communication (in terms of its quality, efficiency and 'fit' with existing activities and practices), with technology designs usually, although often implicitly, expressed in terms of making communication 'better'.[1] This is true even in instances where it is recognised that home and non-work environments are different from the workplace, and that the design and evaluative criteria used in the workplace are not necessarily appropriate. We argue here that while this is one view into what technology can do (i.e. improving the effectiveness and appropriateness of interpersonal communication), this perspective neglects a major component of the social interaction that occurs through messaging media: people making entertainment for themselves and others, through the expression of humour and other forms

of playful creativity, and in their creation and maintenance of a homely atmosphere. This is of course true in both the workplace and the home, and is an important binding part of the fabric of social structures that we are part of. However, this is not to say that such leisure media and technologies are necessarily entertaining, or particularly 'fun' in themselves (and most usually they are not), but that they allow people to artfully express aspects of their own creativity through their use for a variety of leisure related purposes.

The paper then, attempts to examine this aspect of leisure as observed in a field study of communication in the home. We focus on asynchronous messaging and the artful techniques that people employ in their messaging through the use of resources that they co-opt in their messaging activities. Moreover, we focus on *situated* messages – these are messages that are left in a place (not to a person) and which are interpreted as being related to that place, with all of the contextual baggage that this carries. However, before we attempt this, we outline the literature on domestic computing technologies used to support messaging activities and the previous research that has been done on understanding communication patterns within the home to ground our own research within this broader context.

2. Communication at home

2.1 Research into home activities and communication

Disappointingly, at least for technology developers, outside the literature in computer studies there are few studies of domestic life centred on home dwellers' informational and communication lives that offer direct inspiration for technology design. Whilst home life (and more frequently, family life) has long been a topic of enquiry in the sociological (e.g. Silverstone and Hirsh, 1992; Pink, 2004), social psychological (e.g. Csikszentmihalyi and Rochberg-Halton, 1981) and particularly, the anthropological literatures (e.g. Wallman, 1984; Cieraad, 1999; Miller, 2001), for the purposes of design, most of these studies have proved difficult to turn towards supporting technological innovation and understanding the incorporation of new technologies into the practices of their users' lives. Although this previous research provides rich background information about home life, much of this literature has a focus on high level issues such as gender, childhood, consumption and other socio-cultural issues that are of less obvious concern to design, whilst others have employed statistical techniques to identify trends in quantitative data that have say little about the lived practices of those home dwellers that they document. While the area has suffered from something of a lack of interest in the past within computing and technology studies, a number of recent studies of home life with an orientation towards Ubiquitous Computing, HCI and CSCW have begun to produce findings, and we have begun to build a richer picture of what domestic life, at least in the affluent Western world, may involve at a level of detail that can provide technology designers with an insight into the potential for domestic and leisure computing, with for example, special issues on home-based computing in *Personal and Ubiquitous Computing* (in press), *Cognition Technology and Work* (2003) and the *International Journal of Human Computer Studies* (2001).

Technology-oriented studies of home life and domestic activity range across a diverse set of activities, from

mediating intimacy (e.g. Vetere *et al.*, 2005) to 'mothers work' (e.g. Taylor and Swan, 2005), and calendar use (e.g. Crabtree, *et al.*, 2003a; Neustaedter and Brush, 2006), to the organisation and use of paper mail (e.g. Harper *et al.*, 2003; Crabtree *et al.*, 2003b). The organisation of home life has surfaced as an important topic of investigation in the home, mirroring the workplace research and studies that have been influential in the design of organisational and groupware systems. Taylor and Swan (2005) provide an ethnographic account of the design and use of informational artefacts in the home, and the 'artful' ways that these organising technologies are generated and used in scheduling, but also in an important, though less well recognised, function, in shaping the social relations between family members. Other studies, ostensibly examining the role of entertainment technologies in the home, also offer an insight into the social organisation of the home; O'Brien *et al.* (1999) thus provide a description of the distributed and co-operative nature of home life, in particular exploring the role of space, and how family members co-ordinate and interact socially around entertainment technologies, highlighting the 'natural sociality' of home life. In a revealing ethnographic investigation of a variety of homes, Bell, Blythe and Sengers (2005) expose myths about what home actually means to its members and develop a set of design criteria that go beyond the purely functional. They include a commentary on spirituality, community, and even the consumption of pornography (amongst others), and make strong reference to Gaver's (2002) oft quoted notion of ludic design, highlighting the need for designers to support people to 'explore, wonder, love, worship, and waste time', taking a similar perspective on broadening the study of leisure-based activities that we advocate within this paper.

2.2 Computing and communication technologies at home

Within the growing body of research into the home, there is a thread of interest that has begun to point towards the roles that different display surfaces play in the home, perhaps driven by the powerful role that displays have had in the workplace. Attention has been given to pin-boards (Laerhoven, et al. 2003), fridge doors (Norman, 1992; Swan and Taylor, 2005), kitchen countertops, tables and walls (Crabtree *et al.*, 2003b), and even floors (Harper *et al.*, 2003). Parallel to this research, a sizeable body of research has emerged on the design of digital display surfaces, although most of the existing work on public displays has centred on supporting co-worker awareness and co-ordination within the workplace, educational or public domains (see for example, O'Hara *et al.*, 2003), and not activity within the home. A good example of this is the Hermes system (Cheverst *et al.,* 2003). Hermes devices take the form of PDA sized displays that are sited in 'semi-private' places, such as office doors. Their primary function is to allow office visitors to leave private handwritten digital messages, and for the owners of the devices to access these messages locally on the device, or remotely. Display owners may also send messages to the display for visitors remotely, or leave a local message at the display itself. One such project that has moved electronic messaging displays into the home environment is the Appliance Studio's txtboard. The txtboard is a slim, self-contained display device that is intended to be hung on a communally visible wall, which displays text-messages sent to a dedicated phone number. In a field study of the use of the txtboard in a home environment (O'Hara et al., 2005a,b; see also Sellen *et al.*, 2006, on the Homenote system), a range of

important findings were revealed about its use in communication within the home, and the lived practices of the participants in the study. Messaging was used in calls for home members to undertake some form of action, in promoting awareness and reassurance, to demonstrate affective awareness through reaching out to give a 'social touch', as reminders to others, in redirecting messages, and as an information store for later use. Yet although such studies by O'Hara *et al.* and Sellen *et al.* provide valuable detail on the conduct of family life around a public and situated display, these are constrained to a limited set of media and centred around a single electronic display, and so cannot tell us about the wider picture of communication display types and their use around the home.

Other projects in a similar vein include the ASTRA system (Marcopoulos et al. 2004) developing a 'home awareness' system using mobile devices to capture images, short messages and reachability information for later viewing on a monitor in the home by remote family members. This display functionality was found to be important, in that the personal effort costs put into sending the messages at an appropriate time and personalised to the recipient was highly valued, and in evaluation, the system was said to have built an increased sense of connectedness for its users. In another related example, the Casablanca project (Hindus et al., 2001) developed the idea of the media space within a home, designing an application based on a notice board metaphor, the CommuteBoard. The CommuteBoard allowed co-ordination between commuters to support sharing journeys to work, using a shared screen for drawing on between homes, with an audio-based activity monitor to support unobtrusive household activity for co-ordinating the initiation of messaging. Both papers on the ASTRA and Casablanca projects provide a valuable indication of the utility and use of such displays, but unlike the txtboard study, their focus is more on the design of the devices, and less attention is paid to the incorporation of the display into the everyday life of the home and the communication (and of specific relevance for this paper, asynchronous messaging activity) that is undertaken in this context. Similar studies have been carried out in other projects, giving insights into the role that displays may play in communication. Yet few of the papers arising from these projects (albeit with some exceptions) have attempted to go beyond the functional roles that these displays have on communication and awareness, although several provide a tantalising glimpse into how they are employed in the work of 'doing family' in passing. For example, Hutchinson *et al.* (2003) gesture towards the role that their home displays have in supporting family playfulness, but this is not deeply explored in their analysis; clearly, this is a major issue for design, yet requires a good deal more research.

Despite these various studies of communication in the home, there has been little theoretical discussion of the nature and role that display surfaces play in communication. In one of the few papers directly addressing this, Crabtree *et al.* comment on the role of the display as a site, or series of sites for co-ordination and communication:

> "... we consider displays as heterogeneous collections of fragmentary sites constructed where trajectories collide and where displaying goes on to provide for communication and the coordination of practical action."
> (2003b)

Building on detailed ethnographic data, they pull out the *situatedness* of displaying activities, and this is a point of departure that we take in our research, examining how situated messaging displays in the home are crafted towards the purposes to which their creators intend them to be used.

3. Conducting the study

The research described in this paper takes a deliberately narrow point of investigation: the use of asynchronous messaging within the home. The reason for this limited focus was scoped by its planned use in supporting the design of a multimodal messaging display; the intention was that this display would be used within the home to enrich interpersonal domestic connectivity.[2] However, the role of this project was not primarily to increase the quantity and quality of home-unit connectivity or activity and event awareness (although it might also do this), but instead to support domestic relationships and 'home-building' activities. One of the ways that we thought that this could be achieved was through using the displays to support the more ludic aspects of messaging by providing a platform that would allow members of the home to entertain themselves through their own messaging practices. This spin on the notion of display use, with its focus on supporting home-based leisure activities and relationships, rather than a narrow concern with the more functional 'effectiveness' of communication is a novel one, and in order to understand these phenomena, we undertook empirical studies of current messaging practices in the home to examine this.

| | Status | Male | | | | | Female | | | | | Children |
		Age	Ethnicity	Occupation	Working Habits 9 - 5	other	Age	Ethnicity	Occupation	Working Habits 9 - 5	other	Age
1	CH	30's	BW	Sales	x		20's	BW	Administrator	x		
2	SH	20's	BW	Job Seeker	x		20's	OW	Student	x		
		30's	OW	Lorry Driver		x	40's	OB	Nurse		x	
		30's	OW	Asylum seeker								
		30's	OW	Student	x							
3	F	40's	BW	Administrator	x		40's	BW	Administrator	x		17, 18
4	MC	30's	BW	ICT		x	40's	BW	Education		x	
5	F	50's	Ch	Management		x	50's	Ch	Education		x	16
	G						30's	Ch	Accountant			
6	F	40's	BB	Artist		x	40's	BW	Student		x	10, 8, 4
7	F	30's	OW	Management	x		30's	OW	Management	x		6m
							70's	OW	not working			
8	MC	30's	BW	Education	x		30's	BW	Medicine		x	4, 7
9	SH-F	40's	BW	Student	x		40's	BW	Property		x	
		20's	BW	Musician		x	30's	BW	Civil Servant	x		
		20's	BW	Musician		x						
		20's	OB	Student (lodger)		x						
10	S, G	50's	BW	Buisness	x		50's	OW	Writer		x	

Ethnicity			Home status	
BW	British White		CH	Cohabiting
OW	Other White		MC	Married Couple
BB	British Black		S	Single
OB	Other Black		SH	Shared Home
Ch	Chinese		F	Family with Kids
			SH-F	Shared Home of Friends
			G	Frequent/long staying guest

Table 1. Details of the composition of the homes under investigation

The study was based around home visits to a broad mix of 10 homes (see table 1 for more detail of the composition of these homes), made up of a total of around 40 people (with occupancy varying slightly over the study). They included families with children, single occupant homes, homes with intergenerational occupancy or guests, and shared homes; participants came from a variety of ethnic backgrounds, occupations, incomes and age ranges, and worked in both traditional nine-to-five working patterns and in shift work, so that different patterns of communication were necessary. All participant households were paid for their involvement. Data collection from these homes was not intended to offer up statistical data, but to capture a varied set of domestic configurations and forms of occupancy that are more or less representative of typical UK domiciles in an qualitative study of messaging practices.

Data collection involved a series of visits to these homes, extending in most cases over two to three months. This centred on several interviews held with all of the participants (including guests and children) in their own homes, in which we also collected video recordings of the homes and message contexts of use, as well as photographing the messaging artefacts observed (see also Rachovides and Perry, 2006, on the difficulties encountered in investigating domestic settings). In order to maintain the longitudinal and contextual nature of the study, photographic and written diaries were used to collect a record of the participants' activities and their thoughts about the messaging-related activities that they observed or were engaged in. Two disposable cameras were provided to each household and participant households were given detailed verbal and written instructions on their use, and were encouraged to keep in contact with the researchers to discuss any questions or to request additional cameras. Two of the households requested that they use their own digital cameras, and were permitted to do so. Participants were told to keep the cameras in public places in the home and to record their messaging activities in and around the home over the course of a one week period. These recording activities were to be carried out by all members (including children and long term guests) of the homes that we were investigating. Both the written diaries and the processed photographs from the photographic diaries were used in a final interview with all of the household present as soon as was practically possible after the arranged diary week, in which the interviewees 'walked' the interviewer through the recorded events of the week, providing contextual information around these often obscure comments and images. This household interview was an extremely useful device, as it allowed us to observe how different people in the home had created, understood and misunderstood the messages and how they had reacted to them, in a way that would have been difficult if they had been interviewed separately. This is an ongoing project, and we have also conducted a series of technology probes (Hutchinson *et al.*, 2003) in a few of these homes to date. Due to the everyday nature of home life and in contrast to many organisational settings, we have also opportunistically collected data from a number of other homes that we have encountered over the course of the study; these however, have been used to help inform our understandings of home life, and are not directly represented in the data reported here.

Participants in the study were probed on a variety of topics, but given the particular scope of the study on the ludic qualities of messaging, this was a central focus of investigation. Discussions and data collection centred on socio-cultural and emotional factors in messaging practice, such as the use of playfulness, humour, artistic amusement, mischievousness and displays of social connectivity or affect in the information displayed, and how such ludic messaging displays were both created and interpreted through the different media used in the homes. In order to contextualise this, we also questioned the participants on their domestic arrangements and relationships, their domestic roles and tasks, temporal patterns around communication and other aspects of home use, their working patterns, their use of space including the centres of home activity and situated messaging, problems and practices to do with sharing information, and the electronic communication technologies that they employed in domestic messaging.

The findings derived from the study are extremely broad ranging, but we focus here on three elements of situated messaging that speak most clearly about the leisure-related theme followed in the paper. It is important to recognise that these elements are not all independent of one another and may well be interrelated; they include playfulness, as people creatively employed messaging media for their own or others' amusement, the role of messaging in interweaving leisure and domestic work, and the role and use of messages in creating displays of emotion. These are discussed in turn below.

4. Playfulness: making our own entertainment

It quickly became apparent to us that messaging within the home was being used in a variety of forms of play in the homes studied, through humorous annotation to existing messages, drawings, creative use of messaging media and content. Yet this was often difficult to pin down and clearly define as 'play', as the use of these messages was more complex than the term would suggest. Our subsequent examination of the literature on play has shown that this problem is not unique to our own research. Whilst it may be manifestly evident to an observer what play is and when it occurs, play has struggled for a definition of what it involves, and has been described as an elusive topic of enquiry. Ellis gives an excellent summary of different schools of thought and their definitions, but directs us towards an understanding of play in which a definition is counterproductive and in which play activities are non-exclusive to a single category (Ellis, 1973, citing Hutt, 1966):

> '…the sheer heterogeneity of this melange of activities that can be broken down into a variety of categories such as investigation, manipulation, specific and direct exploration, and epistemic behaviour, seems to preclude the general principle of arriving at general principles predicting the nature, occurrence and setting of all of these behaviours' (p.21).
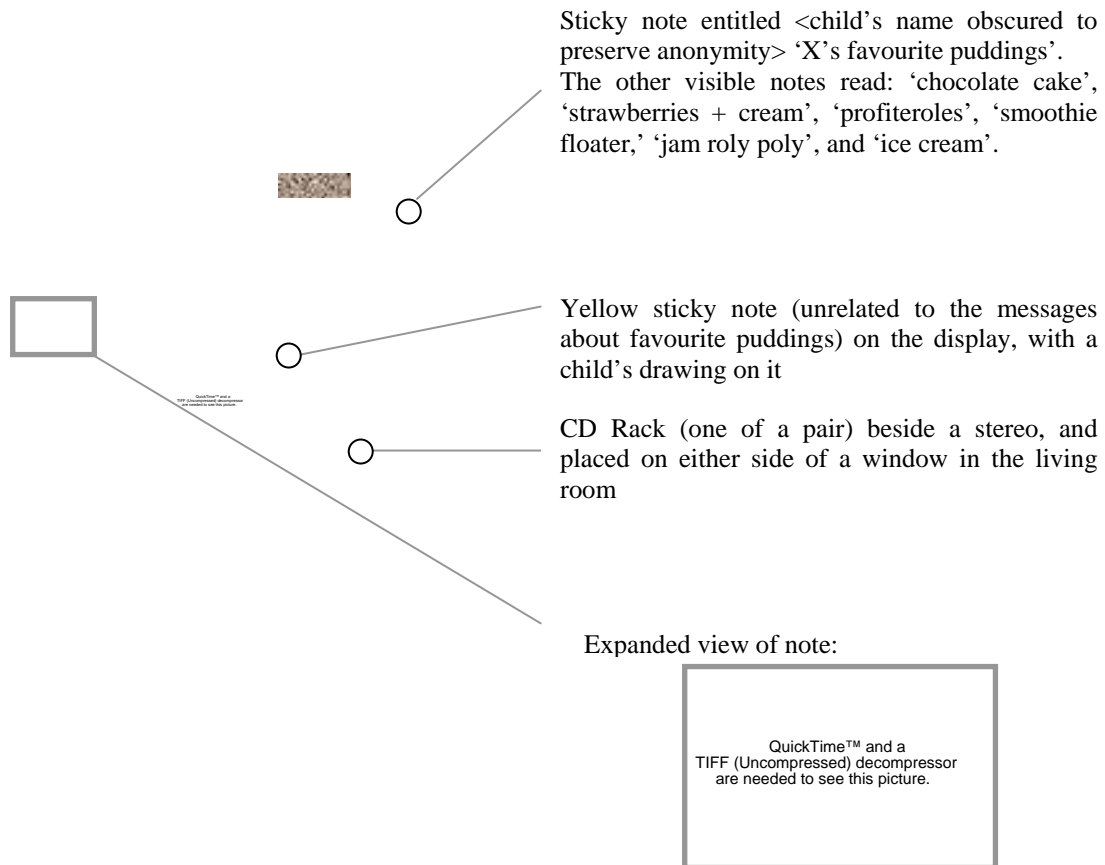
It is clear that a firm definition and theory of play is inadequate, because it does not have a common role and characteristics that help to distinguish it from other activities (Millar, 1968). Millar goes on to suggest that play is best used as an adverb: *playful,* describing 'how and under what conditions an action is performed' (p.21). This sits comfortably with our everyday understandings of (typically game) playing,

which may be deadly serious, and conversely, with everyday tasks and work which can be conducted in a playful way. We adopt this approach here; we are concerned with playfulness in messaging, which may extend beyond the more commonly held folk views of what the term play may mean, and the sorts of activities that are to be considered as play, be this gaming, humour, or its apparent antonym, 'work' (cf. Huizinga, 1938).

This issue of playfulness was apparent in a large proportion of the messages observed or described to us. It was most common in those households with children, both by the parents and by their offspring, but was also seen in the other homes, although it was less apparent within the shared homes and between people with fewer social ties (such as the lodger in home 9). This playfulness covered both the topic of messages, with incitements to do playful things, and the crafting of messages. Evidence of the crafting of playful messages could be seen in the use of unusual or appropriated messaging media, but it could also be seen in the placement of media. For example, in home 8, around 20 blue-tacked postcards were displayed on the toilet door (alongside a child's drawing, a recent birthday card, three photographs, two yellow sticky notes and a few other assorted small paper-based items), so that they could be read 'at leisure' in the bath or on the toilet. As the father commented: father: "*you usually spend time there and get bored, so why not be entertained?"*. These postcards were also occasionally sent in the knowledge that they would be displayed in this location, and the content humorously tailored accordingly, either through the selection of toilet-related or other amusing images, or in terms of the jocular content of the postcards (e.g. "whilst you're sitting here, think of me here on holiday!").

Following McLuhan's dictum (1964), the choice of medium for the message was important in conveying its playfulness for the study participants. We have hearsay examples of this where messages written on misty bathroom mirrors reappear – occasionally inappropriately – when they mist up again. More prosaically, messages written on generic messaging media, such as yellow post-it notes are less easy to pass off as obviously playful (and indeed, we saw this media being chosen to denote the dullness of the message, such as instructions on how to fill a washing machine) than others written on context-relevant media (such as annotated postcards, party invitations and newspaper articles), or personalised media (e.g. highly coloured or odd-shaped paper notes). To illustrate this use of media in conveying playfulness in an example from home 8, sticky 'teddy bear' shaped paper notes were used in a display that was personalised to the demands of children in the home (see figure 1. below). Although commercially available, these sticky notes had been selected for use and customised by the children themselves, with writing, drawings and other colourful scrawlings on them. These notes formed part of a display that was stuck onto two CD racks that were placed on either side of a large window in the living room. As can be seen in the coloured-in note, this display functioned as a record of the son's favourite puddings (the other CD rack displayed the daughter's pudding preferences). These were placed there by the children themselves and ordered by preference from top to bottom (although not left to right, as the parents had assumed which became clear in

the interview), dynamically shifting as the children added to, annotated, or moved them around as they learnt about new foods or their tastes changed. This display was also used as a resource (even arising as a topic of discussion during one family interview) by the children for negotiating around what they would like to eat at their next mealtime.

Sticky note entitled <child's name obscured to preserve anonymity> 'X's favourite puddings'. The other visible notes read: 'chocolate cake', 'strawberries + cream', 'profiteroles', 'smoothie floater,' 'jam roly poly', and 'ice cream'.

Yellow sticky note (unrelated to the messages about favourite puddings) on the display, with a child's drawing on it

CD Rack (one of a pair) beside a stereo, and placed on either side of a window in the living room

Expanded view of note:

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

figure 1. 'Favourite puddings' sticky note display

In a section of this display (seen in the expanded view from figure 1), one of the bear-shaped sticky notes has the message 'chocolate moose' pencilled onto it, a play on words that has arisen from the original incorrect spelling by a parent of 'mousse' as 'mouse', and which had been subsequently and edited to read 'moose'. Again, this illustrates another element of playfulness, as the materials of the message have been appropriated to make a comical observation on this display and to leave an amusing image in the mind of the viewer. Noticeably, the edit on the message also can be interpreted as taking a humorous poke at the original spelling mistake on the message, as well as providing a learning experience for the children about the importance of precise spelling.

In another example of creative playfulness in messaging, we have observed our participants in the homes creatively seeking out the affordances of display surfaces to fit the particularities of their messages. This could be seen at a relatively mundane level, as postcards were positioned under a glass dining room tabletop for reading and looking at when sitting down at a meal, or the selection of vertical surfaces on walls and doors for quick message reference as they are passed by or waited beside. We have also observed this a number of times in a more playfully and creatively complex form, as paper-based messages have been placed on cooker hobs (see for example, figure 2), laptop and piano keyboards, kettle handles, and light switches: items that will inevitably need to be used and which the message will have to be 'dealt with' in some way before the object can be used. There is a degree of temporality or event-related sequencing in this, as the creators of messages are often aware of when these objects that their messages are appended to might be used, so that, depending on the choice of location for the message, the information is likely to be read at an appropriate time.

QuickTime™ and a
DVCPRO - PAL decompressor
are needed to see this picture.

Figure 2. Paper-based material laid out on a kitchen hob

Whilst it might be argued that this kind of situated messaging is simply a practical solution to the organisational problem of context-based reminding, there is more to these kinds of messaging practices than this. What we can see is that artful, imaginative and creative messaging solutions are being generated by people who have engaged with their settings to create meaningful and useful displays. Although it was not always the case that this kind of use of display surfaces in messaging was playful, the frequently whimsical nature of such messaging indicates a playfulness with the materials and context of the home, as people seek to create practical yet evocative solutions for communication. The unusualness of these messaging contexts even evoked some hilarity during the household interviews both as the householders

recalled their amused discovery of the messages at the time, but also (where they had not seen the original messages) in the 'strangeness' of the message settings. Whilst practical, these messages were evidently enjoyed by their viewers and understood as artefacts with more than a solely practical utility.
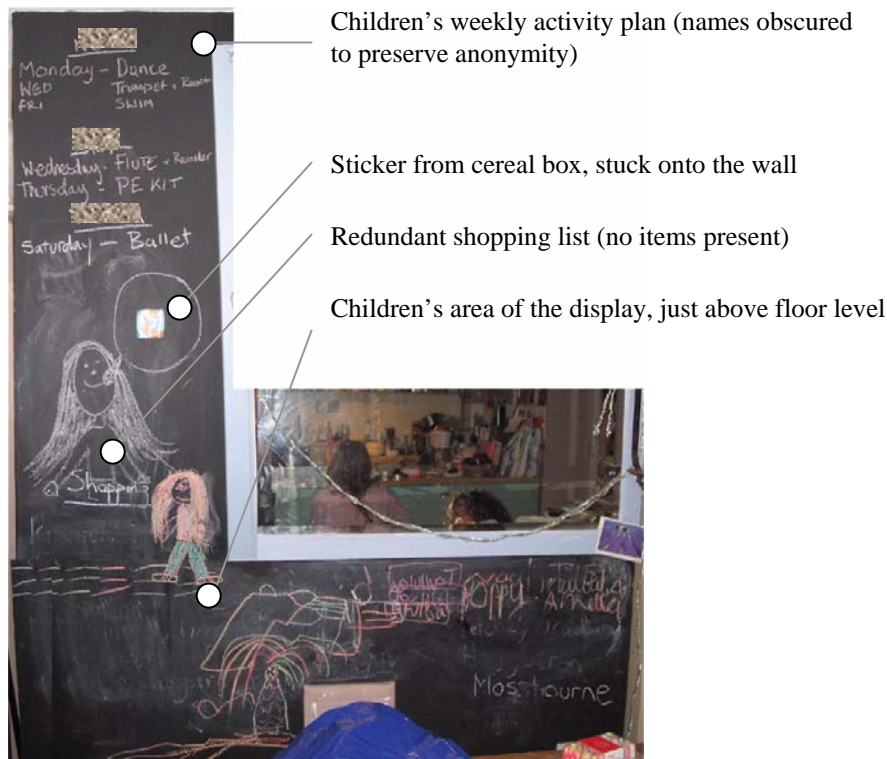
Playfulness is clearly important in the conduct and social performance of home-life, and situated messaging practices appear to be no different. Going about doing things to amuse others and to entertain themselves in doing so is an important aspect of how people spend their leisure time at home. Making creative use of the resources that they have available to them in carrying out their activities (in this instance, messaging), is likely to be seen as something that gives them the ability to be playful: standardising methods of action are both likely to lead to both diminished effectiveness in communication, but also an impoverished leisure experience as there is little opportunity for people to create entertainment out of their everyday accomplishments.

5. Multifunctional utility: leisure and domestic work

Leisure time in the home is rarely spent without some form of domestic responsibility. Indeed, this usually the case for all socially competent members of the household, and it is apparent that there is likely to be an interweaving of functional behaviour with the less obviously functional, including the sociable, emotional and playful aspects of leisure. This interweaving of messaging forms across a variety of uses is explored in this section, showing how leisure and non-leisure activities may be bound together through the messaging practices employed in the households studied.

Developing this argument from the previous section, an aspect of playfulness that we observed lay in people creatively making use of a message to act in more than one capacity, perhaps to simultaneously poke gentle fun at another household member, provide a reminder to them about something that they had forgotten, give them a gentle rebuke or feedback on an inappropriate message that they have posted, or to deliberately demonstrate an emotional response to another family member, whilst at the same time telling them about some functional issue in the home. Here we can see users' playfulness expressed within aspects of more functional communication about things and events. As an example of this, there were many instances of doodling on message boards (whiteboards and chalk boards) and on existing paper messages posted in public places, intermingling functional information about the organisation of home life with more entertaining aspects of use. An instance of this occurred in home 6, where the parents had covered an entire wall in their living area with blackboard paint (see figure 3). Although the size of this display was non-typical, the uses to which it was put were also observed across a number of display media and in other homes. The top level of this display contained information that the mother referred to every morning, while the areas that were accessible to the children were highly volatile over time, and were heavily annotated and drawn over. A great deal can be seen going on here: the display functioned as an organisational medium for planning children's activities, in general home and activity awareness, in use as a dynamic to-

do-list, with different media incorporated into the display (a child's sticker incorporated into the display can be seen on the left, circled). The wall was explicitly intended for multi-person use: it was collectively understood to be used for play, and allowances were made for playfulness in the control that parents operated over it. This was mediated by the affordances that the elevation of the display offered through height access, as the children could not easily delete, write on or over those areas that they could not reach.

Children's weekly activity plan (names obscured to preserve anonymity)

Sticker from cereal box, stuck onto the wall

Redundant shopping list (no items present)

Children's area of the display, just above floor level

Figure 3. Blackboard painted wall

One of the widely used messaging centres (or 'centres of co-ordination', Crabtree and Rodden, 2004) found in the homes was on the door of the refrigerator through the use of magnets (see also Norman, 1992 and Taylor and Swan, 2005). Besides the usual information of charts, travel itineraries, urgent bills and shopping lists, various other magnetic artefacts found their way there, including magnetic 'poetry', a genre of magnetic words or letters in different styles that can be arranged to form sentences. Social interaction around magnetic poetry could be seen in various ways: it can be used to show love and affection, humour, or sarcasm, but could also be used to depict the 'mood' of the person creating it if this was indicated in the content of the text, or of a more general mood in the home at that specific point of time. Similarly, other magnetic games, such as chess or draughts were also present in some homes, and the state of the game or scattered (and even lost) pieces provided an indication of ongoing relationships between householders and their current interests. The interpretation by other householders of the artefacts employed in this playfulness was therefore of some importance to conducting life in the home and in understanding the current interests, motivations and moods of the other residents.

Playfulness within functional utility appeared in a number of guises, even in the way that items as mundane as shopping lists were written: in one, we saw "loo rolls" (toilet paper) with the "oo" dotted to appear as eyes and the 's' elongated to look like a smile underneath them; in another case, as one partner was vegetarian (male) and the other (female) not, they referenced ready meals as 'girly' and vegetarian meals as 'boy's' on the shopping list. Whilst these may appear as extremely mundane and everyday findings, which importantly, we would argue that they are, they serve to illustrate precisely the kinds of activities that make a home what it is: these very ordinary activities and tasks are also deliberately intended to be read as playful, and to visibly express the social relationships that exist within the setting.

6. Displaying care: physical embodiments of affection

As seen in the previous sections, leisure activities are seldom carried out entirely in complete seclusion from friends and family, and whilst they may be carried out alone, even these are usually oriented towards and reflect the social and familial ties that people are bound within. One of the features of domestic life that we observed was in the way that messages were crafted in response to these social relationships. Other authors have pointed out the role of situated messaging in their expressions of love for one another, and in relationship management: in evaluations of person-to-place text messaging (O'Hara *et al.*, 2005a,b; Sellen *et al.*, 2006), messages were frequently used to demonstrate affective awareness through reaching out to give a 'social touch', as reminders to others of their feelings towards them and note that they are being 'kept in mind' even though they are not present. Our own studies of messaging in the home picked up on a number of these issues, and it was common to see and to have messages described to us showing that these communications were done with care and affection, and not just as functional communication procedures. This crafting could be carried out through a number of ways, in an explicit social touch (e.g. 'I love you', 'thinking of you'), but more commonly in an intangible form, in which the nature of the content, its presentation, or the media of the message were selected to demonstrate that particular care and consideration had been paid in initiating and constructing the communication artefact, although this might not be explicitly recognised in the nature of the message itself. This was reflected in diverse ways, from the timing of a text (SMS) message so that it arrived when it was most appropriate, to the obviously time-consuming collation of a variety of holiday brochures and travel materials together in a tabletop display so that they could be referred to in combination with a handwritten note.

In another example of displaying affection in messaging practices, we have examples of shared calendars in which (in all instances reported) the mother kept track of activities and appointments for the entire family. What is interesting within these managed calendaring systems in the home is that the calendars were rarely, if ever, examined by the other members of the home, despite their public availability. In one example, the calendar was kept in the kitchen, and accessible to all of the family although it was not permanently visible (it was kept in a drawer): "*she has one, but no one ever reads it…it's never out*" (daughter, home 3). This

finding is similar to a study on the use of home calendars by Neustaedter and Brush (2006), who identified most home calendars being used by a 'primary scheduler'. The owner of the calendar therefore had to communicate the information held on it to other members of their family as the events recorded on it became relevant: the calendar acted as a driver for communication, but is not a communication medium in itself. In a sense, the mother is doing what mothers have long been expected to do, caring for their family, in this case, by helping to plan their time. Further messages would then need to be communicated by the mother to the family to remind them of upcoming events listed in the calendar; it was not that the calendar was not known about by the rest of the family, but that they were happy that this should be carried out by the mother, and that the mother was happy to 'gift' this organisational work to her family. In terms of the leisure theme pursued in this paper, what we see is an altruistic exchange, as an element of one person's leisure time is given up so that another person does not have to do some form of work. This 'gifting' (cf. Taylor and Harper, 2002) of effort in creating displays and messages is an important one, because it allows people to express their love and affection for others in a practical way – it is more than simply saying 'I love you', it is a practical demonstration of this as a physical embodiment of the care and affection of one person for others.

The creation of displays of affect in messaging was not solely one way, from message creator to viewer. Such displays were often more complex than this, with a reciprocal demonstration of affection for the sender by the message recipient. This typically occurred when the message creator had put some effort into the generation of a message, and where the recipient of the message felt that they had some form of obligation to demonstrate that they appreciated this effort. The most commonly recorded examples of this were messages and pictures sent or given by children to their parents, and which were prominently displayed around the home, but we also observed this between adults. In some instances, these displays may have been for personal and sentimental reasons, but this was not always the case. For example, in home 5, postcards from relatives and friends were prominently displayed under a glass tabletop in the dining room where they regularly entertained guests, although this as much for the sender's benefit (who likely to see the postcards visiting for a meal), as they were for the household's own enjoyment. We have observed similar displays of valued messages between friends in the workplace (Perry and O'Hara, 2003), although akin to their use in this paper, these were employed in a leisure, rather than a work-focussed context. As observed in the workplace, the value of a displayed message may lie solely in the utility that the recipient gets out of seeing their message being seen to be appreciated, and may have no other practical value to the recipient. Indeed their value may be negative: in many of the homes observed, with limited wall or other display spaces available for messaging, difficult decisions may have to be made about what will need to be removed to make space for the addition of new material.

7. Design implications

The study of messaging use in this paper has implications for leisure-based messaging and communication

systems within the home, but it also carries implications about leisure technologies beyond its deliberately narrow confines on messaging and in a broader context of use outside the home. These areas are discussed in turn, beginning with the design implications for domestic messaging technologies, developing the three areas that we have identified in the paper in supporting playfulness, the interweaving of the worlds of domestic work and leisure, and the creation of embodied displays of affect.

7.1 Opening systems up to playful use

We have seen from our analysis that playfulness and entertainment behaviours do not necessarily involve game playing, at least as a formalised turn-taking activity, with a final result, a winner or a loser. More commonly, we have seen people making play with and through technology for a variety of social and individual purposes. Of course, this does not only relate to the home. There is no reason to suggest that technologies supporting playful behaviour would not be beneficial within the workplace (see for example Abramis, 1990, for an overview of play and playfulness in the workplace), in public spaces, public or private transport (see how Juhlin, 2005, for example, has developed technologies to support play and playfulness in cars), or other settings. However, these other environments may have different design constraints, from the forms of playfulness, numbers of users and social contexts that these activities are interleaved with. Here lies a serious point for technology designers: systems that open themselves up for, perhaps unanticipated, use (Robinson, 1993) give their users a powerful tool for artfully integrating them into other practices, a good deal of which, at least in the home, are playful and entertainment-related. By allowing users to generate, co-opt, display and annotate a variety of media we can give them the resources to communicate in a range of ways, one of which is the ability to support play and more importantly, playfulness. And whilst play does require social rules, it is the very socially constructed nature of these rules, and not their technological embodiment, that makes them powerful and allows them to be applied in a variety of ways. We would therefore not encourage strong rule sets that form 'methods' of play, but would rather allow these to be generated and sustained on an ad hoc basis, and to draw from the existing social practices around messaging that household members already use in their everyday lives.

Following this notion of opening systems up to playful, or 'ludic' use (Huizinga, 1938; Gaver, 2002), we have developed an interactive interventionist prototype that we have used as a domestic probe to explore the design of domestic messaging technologies. This probe is essentially composed of a series of situated networked displays, that allow users to create and view a variety of messaging media (including SMS/MMS messages, photographs, BlueTooth messages, voice messages and 'scribble' notes) that may be added to the display locally or remotely.[3] The large size of the displays means that multiple messages can be viewed on a display simultaneously and that these can be observed and read from some distance away. The messaging materials on a display can be annotated and manipulated using the display's touch screen. Although this paper is not intended to act as a vehicle for describing the design and use of our prototype (the 'On-message@home' system) in detail, this discussion about the technology offers some insight into what we mean by opening a messaging system up to ludic use. What we have attempted to do in this design

is to open up a messaging display to use in a variety of ways, and whilst the displays may be used for 'functional' utility (e.g. shopping lists and reminders), they support more playful forms of interaction, such as allowing freehand sketching or annotation onto existing messages, and for messages to be moved around their screens.

In our home-based evaluations of the On-message@home system, the nature of the interaction that the system supported lent itself to playful use in a variety of ways. In one example of this, a mother had just painstakingly created several lists of 'things to do' on the display using a scribble message, when these notes were deleted in front of her (and the rest of their family) by her 17 year old daughter who was teasing her about her mother's need for control over the family plans and routines. Because of the particular characteristics of this technology, the daughter was able to playfully (and with a certain degree of mischievousness) use the display as a publicly visible resource for provoking reflection on power relations in the home and articulating her dissent with her mother's plans. The conversation following the act, and the reaction of those present indicated that this was not carried out as a wanton act of vandalism or as a violent reaction against her mother's authority, and it provoked much laughter from the rest of the family and comical 'hurt' facial expressions from the mother. This conveys the essence of what we are trying to explore in this paper: the artful incorporation of artefacts, electronic or otherwise, in playfulness at home. In this example, we can also see the fluidity of its use across leisure and domestic work (the very functional to-do lists being appropriated in support of 'poking fun' at the mother) as well as the emotional roles that technology might play in everyday domestic life (the mother's perception of her own role in family organisation made visible and subverted through the use of the technology). One can envision other designs for display technologies that would not allow such rich forms of playfulness in social interaction (e.g. accessing and manipulating material remotely over a web page or archiving material so that it could be easily recovered). We do not make a recommendation here about whether or how messages should be archived, rather we make the point that that the design of the messaging system, and importantly, the family's understandings about its functionality, was creatively exploited as a resource by the daughter to initiate a particular domestic confrontation. It is also interesting to contrast the designs of smaller situated messaging displays such as Hermes, txtboard and Homenote with the example above. These displays do not appear to encourage co-present social interaction as their small form factor precludes such 'over the shoulder' viewing of activity. Playfulness can therefore be encouraged through making visible the act of messaging, and not just through the subsequent viewing of messages.

While we make a case for opening systems up to playful use by allowing their appropriation for non-productive purposes (in the sense of their practical usefulness in the organisation of the home), care may need to be taken in managing such systems. There are 'humorous' activities that may be deemed unacceptable within particular places in the home, such as commenting on what are deemed as sensitive topics (e.g. sex, death, drugs), or where such messaging might be used for bullying, or parental or other

shared occupant's prying into previous events and is deemed to be inappropriate. These concerns give rise to management issues of information related to particular places: this is not necessarily just a matter of content control (information allowed onto the system), but of content management (who can access and delete electronically held information). This issue is particularly problematic when there may be no clear boundaries about what content is allowable, or of who has access to the electronic information held on the system. Of course, these are similar concerns to those that we might see in paper-based systems, many of which we have catalogued in the homes visited in this study. But there is a difference here, in that electronic systems can be invisible to external monitoring and 'social' policing (as with SMS text messages and Internet chat rooms) and thus are open to what may be deemed as less responsible patterns of use. We need to recognise that messaging, like other leisure activities, can also take place within environments that children inhabit, as well as the adults that such technology is typically marketed at, and the concerns that we have of children, and the behaviours that they exhibit, are different to those of the adult worlds of work (at least those outside of childcare and education).

7.2 Interweaving domestic work with leisure

As well as supporting playful behaviour, our analysis has identified the interweaving of domestic work and leisure as an important issue in messaging activity. There are implications for design here, as our leisure time is highly fragmented and may involve work of a variety of kinds (e.g. washing, shopping, teaching children, organising ourselves and others). This is not to say that we cannot use these domestic chores as foci for entertainment, or that we cannot entertain ourselves whilst doing them. Recognising that these activities are interwoven with one another is important when designing for leisure settings. The mechanistic sounding 'centres of co-ordination' in the home are also sites for conducting non-organisational aspects of life: playing games, sticking pictures, and providing opportunities for learning, amongst other things. Some of the examples that we have seen in the data, for example, on the humorously annotated shopping lists, the blackboard covered wall, or the mass of material stuck to fridge doors could not be easily substituted by electronic media to support their organisational roles without losing a great deal of the entertaining qualities of these more flexible media. Electronic shopping or to-do lists might be more effective in getting these chores done more efficiently, but they are impoverished representational forms that lack essential characteristics that make a home what it is.

The home is not, to partially misrepresent the architect Le Corbusier (1946), simply 'a machine for living in', but a place for doing the whole range of social, physical, emotional, pedagogical, organisational and entertainment activities that make up our domestic lives – a major component of which involves leisure. The reference to Le Corbusier is apposite, in that he saw the objects of daily life as functional elements that could be understood through rational analysis (you might almost read this as 'task analysis') and whose form and function could then be standardised and optimised, and this is often what we do with systems design: we tend to look at improving 'tasks' through the provision of new computational mechanisms. Yet the recognised failures of modernist architecture in its support for the realities of the messiness of everyday

home life are testament to how little flexibility this offered people in conducting their own, ongoing, peculiar and occasioned domestic practices. Our analysis shows this also to be true for the practices of messaging in the home: the functional purposes of messaging (in communicating some element of information from one person to another) are carried out in a rich context of other domestic leisure and entertainment activities that permeate through the artefacts and activities within the home, and carry over into those 'functional' purposes of messaging, even to the extent that the overt functional purpose of a message may itself be of secondary importance. As designers, we need to be sensitive to this in our designs of systems to support domestic work, so that this does not cut through the rich and textured milieu that our current domestic practices and technologies sit within that have other purposes, and which make a house into a home.

7.3 Embodying affect in messaging displays

The creation of embodied displays of affect in messaging forms the final issue considered in the analysis, and this too has design implications. The use of situated messaging to convey emotional meaning was evident in a great deal of the data, both in the messages sent, in their display and continued presence long after their functional informational value had passed. This was seen in how the messages had been positioned by recipients, or appropriated into displays together with other related materials. One of the characteristics of messages that were displayed and understood as emotionally valued was in the effort that had gone into them, either expressed in the content of the message (i.e. stating that some effort had been carried out, e.g. that a present had just been bought for the recipient of the message), or in the crafting of the message itself (i.e. visible effort in the substance of the message itself, e.g. in the selection of a meaningful image on a postcard, or hand painting of a birthday card). It is the second of these emotional aspects of messaging that concerns us here: the representational forms used in many electronic messaging media can make it difficult to demonstrate any effortfulness in the crafting of those messages. Certainly, it may be more efficient to send a low effort message, but the meaning that is conveyed may be diminished through the impoverished representational quality of the message. In a slightly facetious example to illustrate this, a birthday greeting that is obviously automated by a database would carry little (or even a negative) value to its recipients. There is a slightly counter intuitive design recommendation here to allow message senders the freedom to create high-effort messaging media. This is not to say that message senders will always wish to put a great deal of effort in the creation of messaging media, but that they should be afforded the opportunity to do so, or indeed to visibly *not* to choose to do so (which may itself convey a particular emotional meaning).

Following the previous point, situated messaging displays have a reciprocal nature in that the sender may be able to see their own messages on display. As we have seen in the examples of paper messaging, by affording a special position to particular messages, the message sender may be able to recognise the emotional value that their own messages have for the recipient. Thus, messaging displays may be crafted by their users as much for the senders benefit as for their own use, again, a somewhat counter-intuitive

finding that is likely to be very different to non-leisure contexts of use. This last issue is particularly important for messaging displays where the message senders are co-present with their recipients in a way that is not the case when they are distributed over different sites and may not see the physical environments that people create around themselves. One implication of this is that messaging displays may benefit from allowing users to make received messages permanently visible or to foreground them if considered appropriate. Automatically deleting or archiving old or read messages (an otherwise seemingly sensible design decision) may in fact be detrimental to supporting emotional connectivity in the household. Such a solution may also be of benefit for messages with sentimental value in allowing users to keep specially meaningful messages permanently visible, although other solutions such as providing ready access to an archive for message retrieval may be more appropriate. This is similar in some ways to the archival of valued text messages on mobile phones (Taylor and Harper, 2002). These are not messages that need to be visibly displayed for the benefit of others, but instead users need to know that they can be re-accessed and displayed if they choose to do so.

Another of the points noted in the discussion about the emotional role of messaging lay in the way that people used the existing messaging systems to take on the responsibilities of others. Thus they would 'gift' their own labour so that others would not need to do this work, such as remembering to do things themselves. One of the implications of this is that home messaging systems may benefit by leaving control access 'open' at the display. For example, using passwords or personal electronic keys to read messages addressed to individuals would largely prevent this form of use: if users are only able to access information about themselves, they will not be able to find out what other people are doing, and be unable to take on these responsibilities. Interestingly, this approach to interaction is also taken by the home-based txtboard and Homenote messaging systems, but not Hermes, which is intended to be used in the workplace, and it is possible that this implication for open access is particular to the home and other semi-private settings.

7.4 General implications for messaging and leisure technologies

Although domestic messaging technologies require a core functionality in supporting the creation and display of messages, we have shown that it is important to consider other issues in the design of leisure-based messaging systems, particularly in supporting creativity in the generation of messaging media and their content, in message placement, and in the eventual use and management of messaging media. At a practical level, this means that situated display systems which 'flatten' messaging out with a fixed format, or apply 'intelligent' processing to re-format or edit messages prior to displaying them are likely to have a detrimental effect on their use, by limiting the creative ways that messaging can be conducted and on the contextual interpretations of received messages as to their actual intentions. Thus for example, message formats (for example, MMS media) that are sent need to be represented on the recipient display in the same form that they are sent, as elements that are intended to be interpreted as playful may be lost.

Beyond situated messaging systems in the home, there are more general implications for the design of

leisure technologies that we can draw from the analysis. At the centre of these implications lies the point that many activities that we tend to regard as purely functional are often heavily tied to other non-functional and leisure-related purposes. Broadly, we have seen that the worlds of work (in the case of this paper, domestic work, but there is no reason to suggest that other forms of work are likely to differ greatly) and leisure are not neatly separated by time or place, but are interwoven, the one permeating the other through the actions and artefacts that are used. Supporting the ability for people to employ their own creativity in the ways that they undertake their tasks will give them the opportunity to act playfully or to convey and practically demonstrate their emotional interests their if they wish to so.

A final point arising from our re-examination of the nature of leisure and the design of leisure technologies is that the usability engineering approaches and techniques currently in use for technology development (i.e. the criteria that we have for evaluating and developing such systems) may be inappropriate and practically unsuited for the development of leisure technologies. In the context of productivity computing, articulated as it is around a mantra of efficiency, effectiveness and usefulness, the concept of leisure computing is a problematic one (see also Crabtree and Rodden, 2004). This point is similar to Gaver *et al.'s* (2005) call for the use of ambiguity as a resource for design in encouraging close personal engagement with systems, and through suggesting issues and perspectives to users for consideration without imposing solutions on them. Whilst we do not make a case for use of ambiguity in domestic messaging systems here, Gaver *et al.'s* theoretical position is similar to ours – recognising that the focus on speed of interaction, informational consistency, the reorganisation of tasks to support more effective use of our limited cognitive resources, and so on, are not the only way to support human action in all contexts. The way that we design and evaluate such systems needs to take into account more than the limited set of criteria and metrics that have traditionally been used in the user-centred design and usability engineering processes. How we allow people to be playful, to connect their workaday and leisure activities, and to express their social and emotional lives are questions that do not fit closely with the design and evaluative criteria that we have developed over the last twenty years within HCI. A good example of this can be seen in the development of metrics for evaluating peripheral displays (Mankoff *et al.*, 2003), with heuristics for evaluation that include assessment of its informational relevance, consistency and intuitiveness of interactional mappings, transitions to more in-depth information, and internal state visibility, as well as more situation-specific criteria, such as considering the match between design of the display and its environment and assessing its aesthetics. Whilst these heuristics may be helpful in supporting the effective and efficient use of resources, they are still oriented towards supporting productivity, and not primarily their 'fit' with the very ambience of their settings, as we argue, supporting the enriching and non-functional qualities of everyday life. Whilst we have found this work useful in our own research, its focus on primarily functional issues of use does not lend itself well to evaluating the role of such displays in appropriation for other purposes, such as for humour or in creating displays to demonstrate affection. We need to develop new criteria for assessing the appropriateness of leisure technologies that can be fed into the design process, and as we have discussed,

those centred around current notions of 'usability' may be inappropriate in this case.

8. Conclusions

We have attempted to provide in this paper an indication of what a leisure technology might need to support, extending this beyond the scope that the current notions of leisure technology have been presented to us as consumers. Even though the study has only examined a very limited aspect of home life, with a restricted view into the way that leisure is conducted, it appears that valuable lessons can be learnt from this for design. Looking at what our lives at leisure actually involve can provide a rich insight into our activities that need support and particular care in the design of leisure technologies that fit with our leisure practices. Alongside our critique of the current paradigm of what leisure technology is, the dictionary definitions provided of leisure are limited in telling us about what it involves at a practical level. The notions of slacking, being 'offline' and 'downtime' that form a part of what the term leisure is considered to mean are limited, and not all domestic life could be described as slow-paced and leisurely. On occasion, our leisure time at home may be extremely frenetic, more on a par with what we would conceive as the time-pressures and busyness of the workplace, and it would also be a mistake to say that the forms of leisure activities practiced within the home are universally 'fun' or good humoured for all of those involved. The everyday expression 'making fun at someone else's expense' illustrates this quite clearly: we may well remember from our own experiences when we were the butt of someone else's fun, or where we provided amused entertainment for others unbeknownst to ourselves. What is important here to recognise is that there is an element of creativity in our 'making fun' – the juxtaposition of unlikely ideas together, drawing of satirical pictures or scribbled comments, displaying annotating pictures, posting of puns, jokes and humorous materials in shared social areas, and so on. That these materials may be used in non-trivial ways, from what we might consider as positive (e.g. building a home or family identity) to negative (e.g. bullying) does not concern us here, and we remain deliberately non-judgmental about this, at least in terms of our definitions, although, as we have shown, the uses to which messaging displays may be put could have implications for design.

Beyond the notion of leisure as entertainment, we also see leisure as bound up within social and family relationships. How people use their leisure time to build and cement their relationships is important, even at the simple level of asynchronous messaging that has been examined in this paper. As with our critique of the entertainment aspects of leisure in which people are not necessarily highly engaged, we can also see this as true for the emotional aspects of leisure. There are gradations of emotional intensity that we see present in messaging, many of which are at a relatively low level of engagement. The role of visibly making an effort in a messaging display to demonstrate an emotional relationship is an interesting one. Demonstrating emotional relationships through the media and artefacts that we utilise in our leisure time is evidently important to us, and occupies a significant proportion of what we, as socially competent actors, do during the time that we have with our friends and families. Of course, how time and effort can be

embodied in electronic media is not an easy translation to make, but it is certainly one that deserves consideration in the design process for leisure technologies.

Notes

[1] We recognise that improving the 'quality' of communication in these various ways has the potential to improve social interaction and interpersonal relationships through indirectly supporting humour and playful activity. Thus we see communication technologies that support communication from person to place, increase the variety or richness of the media used, or that allow visualisations of home-based information, all of which have a role in phatic activity. Yet the metrics or criteria that they use to identify this quality of communication are usually centred around issues such as contextual relevance, appropriateness of the media in the context of use, representational ambiguity, effective use of resources, and so on. However, by focusing on support for enriching and increasing communication, and not directly on supporting ludic behaviour, these studies and new technologies do not attempt to offer specific understandings of, and support for entertainment and leisure.

[2] The research described in this paper has been conducted as part of the 'On_Message@home' project, funded by Microsoft Research in the 'Create, play and learn' programme (2005-06), investigating users' home-based messaging practices in support of playful and entertainment behaviour, and in developing experimental and interventionist technology designs for domestic messaging displays.

[3] A more detailed description of the probe designs for the On_message@home system can be found at: <http://people.brunel.ac.uk/~cssrmjp/On_message-at-home.htm>.

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