

SPAM on the Menu: the Practical use of Remote Messaging in Community Care

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ABSTRACT

This paper presents some early design work of the 'Digital Care' project, developing technologies to assist care in the community for user groups with different support needs. Our focus is on developing a SMS Public Asynchronous Messenger (SPAM) system for SMS messaging to a situated display in hostels for ex-psychiatric patients run by a charitable Trust. Such settings pose both methodological and design challenges. We face the methodological challenge to uncover requirements in such a sensitive domain by using ethnography, cultural probes and user workshops. The design challenge in this care setting is to provide support rather than new forms of dependence, and we report on early experiences of the deployed system.

Categories and Subject Descriptors

H.4.3 [Information Systems]: Communications Applications – electronic mail.

General Terms

Design, Reliability, Human Factors.

Keywords

SMS messaging, requirements, ethnography, cultural probes, user workshops, community care.

1. INTRODUCTION

This paper presents some of the early design work of the 'Digital Care' research project - begun under the broader EPSRC IRC Network project EQUATOR [6]. The project is concerned to

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develop enabling technologies to assist care in the community for user groups with different support needs. In this case, the focus is on developing an SMS Public Asynchronous Messenger (SPAM) system for SMS messaging to a situated display. Designing for care settings must not only take account of the usability of applications, but also how such technologies and their uses are integrated into a range of social contexts. Building on prior research in domestic environments as sites for the introduction of new information technologies [14, 17, 22, 23] our interest lies in understanding the social context, in the interaction between the social and the technological space, and considering when and in what circumstances technology becomes not only technically feasible but socially relevant. In amongst the technical challenges are issues concerning the moral and ethical components of the design enterprise in a complex application domain. The challenge for design in these settings therefore, is not just to acknowledge a range of moral dilemmas but to attempt to embody a philosophy of care into design guidelines. The design challenge in our care setting is to provide support for individuals in the move towards independent living, rather than creating new, technological, forms of dependence.

2. CONTEXT OF USE: UNCOVERING REQUIREMENTS

The setting for our project is a hostel and nearby and associated semi-independent living accommodation, managed by a charitable trust, for former psychiatric patients in a large town in the North of England. The hostel is the first step for patients leaving the psychiatric wards of local hospitals that are currently being closed down. In the hostel residents are provided with a room and are monitored and helped to develop independent living skills by a number of staff. Residents can then move on to the other, semi-independent living site of sheltered housing consisting of a number of flats and bed-sits, prior to moving out to flats in the local area, or, if they are deemed to need further and continuing support, back to the hostel. The overall aim of these facilities is to gradually introduce the patients back into the community and allow them to support themselves and any technology introduced into the setting should contribute to this and other identifiable care goals.

3. UNCOVERING REQUIREMENTS: CULTURAL PROBES AND USER WORKSHOPS

A primary objective of the project is to improve the quality of everyday life in such settings by building and adapting a range of technologies. Moreover, designing with care demands the development of inclusive strategies and techniques. While there is great promise that technology will enable and assist users in care settings, it is of fundamental importance that designers recognise that solutions devised on the basis of inappropriate investigative strategies and techniques can be debilitating and dis-empowering. Consequently, when considering design for care environments, traditional technological approaches need to be supplemented by detailed investigations into everyday life and user needs.

In the absence of an established design literature in this area, our approach is characteristically ethnomethodological [9] - concerned to pay to the commonplace activities of daily life in residential care settings the attention usually accorded extraordinary events. Accordingly, we approach the study of care settings by considering various 'what' and 'how' questions regarding how affected parties live their everyday lives. In adopting this position, we are suggesting that when considering technological intervention what is needed is a position which enables designers to understand these sensitive settings 'from within', attending to members' perspectives and thereby producing concrete recommendations for design. The kinds of research questions we are concerned with include general questions about the social organization and coordination of space and place as well as more specific issues to do with the availability and use of existing technologies and their affordances. We have been interested in how users organize their day, the kinds of things they do and how they go about doing them, their use of technology, the organization of their personal space and so on. But developing an understanding of care settings from within is evidently not a straightforward matter. Residential environments of whatever sort are much more personal spaces than workplaces and, unsurprisingly, persons are not always so willing to have researchers pry into what most would regard as their private lives. We have therefore sought to supplement our understanding of the internal character of care settings through the adoption and use of User Workshops and Cultural Probes [10] combined with ethnography [13] wherever possible to provide insights into the needs of users.

The Cultural Probes approach, Gaver [10] argues, brings designers and users closer to the design space in a way that is seemingly different from conventional ethnographic methods by attending to the 'ludic' character of users' lives to *inspire* design. In contrast, we use Cultural Probes - cameras, diaries, maps, dictaphones, photo-albums, postcards etc. - as a way of *informing design* by deploying probes as instruments for eliciting *information* from the members of user groups that are difficult to research by other means and as a way of uncovering or at least shedding light on users' social context, their, emotional, personal and aesthetic values and habits. At the same time the probes also provide an engaging and effective way to open up communication channels and foster an ongoing dialogue with users involving them in the design process.

Some initial requirements for the SPAM system were also obtained through a one-day design workshop with the care staff - who are, necessarily, an essential feature of the users' social context. During the workshop, a number of possible scenarios were outlined involving situations in which residents or staff members needed to inform the site of their circumstances. Following the discussion of these scenarios, possible problems and solutions in terms of some form of visible display in the staff rooms were discussed. The workshop also revealed a number of other circumstances where some form of messaging system might prove a useful addition to current facilities. So, for example, members of staff reported that they often found it problematical to communicate effectively using only the phone:

"You're working down at ... and the phone is constantly engaged at (Hostel)"

"Having a system just to contact (Hostel) .. because the phone's engaged most of the morning .. its just luck that you get through.."

The overall response to the idea of a messaging system was therefore positive. In particular, such a system was viewed as another tool for communication capable of supporting staff in their everyday work and interaction with residents. In this respect, the user workshops and cultural probes enabled us to meet what Edwards and Grinter [5] regard as a major challenge for designers, namely elaborating:

"... the stable and compelling routines of the home, rather than external factors, including the abilities of the technology itself. These routines are subtle, complex, and ill-articulated, if they are articulated at all ... Only by grounding our designs in such realities of the home will we have a better chance to minimize, or at least predict, the effects of our technologies"

4. PUTTING SPAM ON THE MENU: DEVELOPING THE MESSAGING SYSTEM

What emerged from our ethnographic studies of everyday life at the hostels, the cultural probes materials and the user workshops were various issues of the coordination of everyday working life; coordinating the mundane interactions of staff and residents. Our attention was drawn, in particular, to what Zerubavel [25] would view as the 'temporal rhythms' of work and everyday life in the hostel; a notion that helps us understand the collaborative work of the hostel by highlighting the intrinsically temporal and cyclic nature of that work. In the everyday work of the hostel a number of working rhythms can be perceived - shifts and shift handover, 'visiting' rounds, movement of residents into, around and out of the site, medication delivery, resident and staff meetings etc. Such rhythms were not only important to the staff for coordinating their daily work activities [14,15] but also for the residents, serving a communicative and a therapeutic function. The rhythms of daily activity orient residents and staff to their present and future activities and any relevant requirements and such knowledge allows them to plan their activities accordingly.

At present staff activity is coordinated through the use of a diary, notice-board a telephone answering system and an on-call pager system. However, ethnographic observations of these technologies in use revealed a number of instances when they proved less than satisfactory, where the manager would lose track of where workers were or staff might be unable to alert their colleagues to

relevant circumstances, for example. Ethnographic studies elaborated the temporal rhythms of the hostel and any shortcomings of current technologies and in combination with the user workshop and cultural probes revealed a number of circumstances where some form of messaging system might prove a useful addition to current facilities and as a way of getting round current problems.

4.1 The SMS Public Display

Following the early ethnographic study, deployment of cultural probes and user workshop we developed an SMS public display system. It is important to emphasize that the key requirement for our technology solution was dependability. For this reason, the deployed system is completely based on off-the-shelf components which were combined in order to produce a highly reliable, quiet and unobtrusive system requiring minimal disruption to the office environment in which it is deployed. For example, because the system utilises GSM for network connectivity, the SPAM system does not require any additional network wiring to be carried out in the room where it is deployed. The remainder of the section describes in some detail (hopefully sufficient to enable the interested reader to assemble a similar system) the technical configuration of a SPAM unit.

After considering various solutions for the case of a SPAM unit we selected to use the Shuttle SV24 Barebones case [19] (see figure 1).



Figure 1 – Front view of case with aerial

This reasonably stylish miniature aluminium case contains a FlexATX [8] motherboard with all the functionality we required onboard; video, sound, networking, USB, IEEE 1394, TV out. The SV24 case also contains 2 x 3.5 inch bays and a single 5.25 inch – space for a CD/DVD drive, floppy disk drive and internal 3.5” disk drive. The SPAM units would not require a floppy disk or CD/DVD drive, and leaving them out helps to disguise the case (as it looks far less like a fully functional PC) and removes any issues of users installing additional software. The 3.5” hard disk drive is mounted inside a SilentDrive™[20] enclosure, this drastically reduces the level of noise produced by disk drive - usually the primary cause of noise produced by computers.

We selected the 800 MHz C3 processor for our application; this processor only requires passive cooling when used with an approved heatsink but due to space limitations use of a smaller than recommended heatsink was unavoidable. After investigation it was found that using a smaller heatsink with a fan running at 6v instead of the usual 12v would keep the temperature well below upper limits, even at sustained 100% CPU utilization, also dramatically reducing the noise produced.

To provide the facility for sending and receiving SMS text messages GSM connectivity is required. Following a survey of available solutions, the Siemens M20 Terminal was chosen. The M20 is effectively a cellular mobile phone in a box, minus keypad and display, requiring external power supply, aerial, and providing a 9 pin D-type serial interface. The device is similar in operation to the usual computer MODEM, accepting the standard Hayes AT compatible [12] command set over a serial connection, though an extended command set is used to enable the sending/receiving of SMS messages. The device is relatively compact and can easily fit inside the case, and with a specially made power cable can use the case’s internal 12v power supply. The M20 is situated in the SV24’s spare 3.5” bay at the rear of the case.

To help reduce costs we selected the smallest, cheapest LCD touchscreen available, fortunately this was a high quality 12” resistive touchscreen unit with a serial interface, available with a pedestal stand.

The combination and configuration of the aforementioned off-the-shelf technologies is a specialised miniature PC package, providing GSM connectivity and touchscreen. From the exterior it is hard to tell that the unit is a fully functional PC, and even harder to tell that it contains an expensive GSM MODEM (see figure 1). This configuration needs no additional peripherals, and its size (the unit has a footprint of just 320mm x 146mm) allows the unit to be easily situated on (or under) a desk in an office. Furthermore, the noise-reducing features of the components makes the operation of a SPAM unit significantly quieter than that of a standard desktop computer.

The SPAM units run an application that allows staff to send and receive SMS text messages. Staff can compose messages using an on screen keyboard displayed on a touch sensitive screen (see figure 2). When messages are received by the SPAM unit they are displayed on the screen until deleted by a member of staff. Staff can also use their own mobile phones in order to compose and send text messages to a particular SPAM displays when they are out of the office. Staff can also receive on their mobile phone a text message originating from a SPAM display.

In addition, the system also provides residents located off-site with an additional means (i.e. in addition to the phone system currently installed) to communicate their situation to staff, e.g. *"I've just missed the last train"*.



Figure 2: One of the SPAM displays showing messages received.

The overall design of the system architecture is shown in figure 3 - this highlights the way in which SMS messages sent via mobile phones are handled by the system.

Following the arrows in figure 3, the typical scenario is illustrated by SMS Message 1, i.e. the message is successfully delivered to the permanently staffed hostel (Location B) and the transmission of a 'message read' acknowledgement is triggered by a member of staff reading the message. Message forwarding is performed by the system if a message is sent to the semi-independent living accommodation (Location A) at a time when no member of staff is providing cover (denoted by AWAY STATE). In this case, the message (Message 2) is automatically forwarded to the display of the hostel with 24 hour cover.

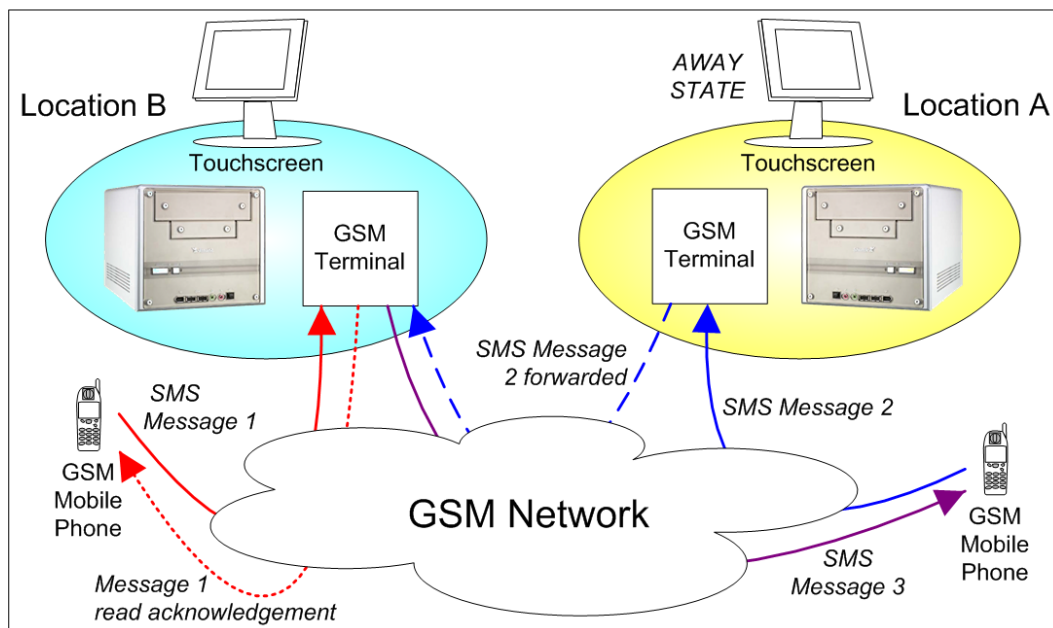


Figure 3: Architecture of the SPAM system.

5. USER EXPERIENCE: "HOW DO U TURN A DUCK IN2 A SOUL SINGER? - PUT IT IN THE MICROWAVE UNTIL ITS BILL WITHERS"

When designing the SPAM system we were keen to ensure that a logging system was in place to enable us to gain some insight into the system's everyday use. These resulting logs, as well as a subsequent user workshop, suggest that the SMS messaging capabilities of SPAM are being used effectively. Examples of SMS messages sent to SPAM include: "SORRY IM GOING 2B LATE DARRIN" and "blocked in snow will be late". Such messages illustrate an explicit sharing of context in order to support (or potentially support) cooperation with colleagues.

The use of remote messaging to situated displays in order to support that sharing of personal context in this way is very similar to the use of remote messaging experienced with the Hermes system [3] deployed at Lancaster University. The Hermes system enables lecturers in a computing department to use their mobile phones (or a standard web interface) in order to send messages to digital displays situated outside their offices and the majority of such messages share context (usually with a location or temporal element) in some way [4].

With SPAM, the user has significant control over the information that is shared but members of staff may be prepared to forgo some control in terms of who is able to view the information. There are, of course, issues of confidentiality and privacy to be considered and these concerns have already been anticipated. Initially, we wondered if the issue of confidentiality for example, might arise because residents are generally assigned to a single staff member who visits them and coordinates many of their activities such as visits by their psychiatric social worker etc. Displaying messages

on-screen and viewable by other staff members might be regarded as a possible breach of confidentiality. We had some concern that messages sent by residents to an individual team member should only be readable by that member - suggesting a design solution in terms of the transfer of messages to individual staff mobiles. However, the staff argued forcefully that they worked as a team and the team overrode any such issues of confidentiality.

"I don't think having the message relayed to an individual's mobile is (a good idea) .. we work as part of a team .."

(Researcher explains.. maybe that particular resident won't want to talk to anyone else?)

" .. it can happen but .. we don't encourage it .. we actively discourage it.... when you're working with personality disorders ..(we don't want) for them to create a dependency on a single person which can happen.."

".. we also make it fairly plain that anything told to (an individual team member) is shared.. is told to the team.. ..you've got to work as a team and share as much information.."

In a similar fashion, the staff argued that concern about security and the requirement for some system of authentication was not necessary because any screen was never going to be accessible by residents since the staff were always in the staff rooms or the doors were locked. At the same time the messaging system was perceived as having some advantages over the current answer phone when it came to issues of privacy:

".. people talk at different volumes .. there's always the chance of people overhearing .. and the messages you receive.."

The staff also saw some value in incorporating some simple system of acknowledgement into the system:

"I'd imagine a screen in the back office .. it could be from 9-10:30 nobody actually goes into that back office .. we're out cleaning, doing things, whatever .. any message would have to stay on there for a while ..or be able to alert us to an urgent one.. You're in the middle of .. dispensing medications .. you don't want to spend time responding I need to be able to just push part of the screen to say to send a reply like "I've got the message, I'm thinking about it" .. its done.. if I have to get the phone, phone somebody ... its just taking too much of my time.... the technology is not helping me that much.."

Having installed the messaging equipment, ensured it functioned adequately and demonstrated it to the staff, the system has now been in constant use for approximately nine months.

The general reactions to the system have been excellent:

"..we're delighted with it .. we've all started to use it very quickly.. and we're using it a lot..". "I think people at first thought it was going to be really complicated but it couldn't be easier we find it extraordinarily useful."

Examination of the logs suggests that current usage seems focused on confirmation (*"Has Fax, email got through? Has x left yet?"*); coordination between sites (*"Pizza & and chips are ready come on in :-)"*), simple queries (*which keys should we hand over?*) to signify delays (*please ring car wont start*) and so on.

The logs also reveal a growing familiarity with SMS or 'textspeak' (*"what does 18tr mean?" .. "later in sms speak, get with it babe"*) and its use to tell jokes (*"how do u turn a duck in2 a soul singer - put it in the microwave until its bill withers"*) suggests the technology is slowly becoming organizationally embedded. These initial findings indicate that rather than having a sudden impact, the SPAM system is gradually finding its place in the regular patterns of members of staff as a tool to usefully supplement (rather than instantly make redundant) their existing uses of technology. That is, as with other applications (and, coincidentally drugs), people 'learn to become users' [2]. As Becker [1] suggests, *"the first step in the sequence of events that must occur if the person is to become a user is that he must learn .. the proper technique so that his use.. will produce effects in terms of which his conception of it can change.."* Furthermore, with experience and growing competence, comes 'unanticipated use' - particularly since the device is being deployed in a novel environment, providing support for Robinson's [18] suggestion that work is *"best supported by the provision of resources"* rather than *"trying to anticipate its specific sequentiality"*.

Nevertheless, a number of further requirements and suggestions concerned with connectivity, interface and usage have been articulated and incorporated into the design. A second user workshop has been held to get more feedback from the staff and prioritise requirements for modifying the system. The workshop suggested that developing usage has raised issues to do with privacy, text language and the appropriate level of interaction. Emerging requirements have included a facility to block numbers (to prevent abuse from residents); facilities for multiple messaging; emoticon buttons (to 'soften' the perceived harshness of textspeak); a menu of regular messages for saving time and a 'hide' facility (to ensure privacy).

(staff) "Its confidentiality thats the primary issue you know .."

(researcher) "..so what you want is a button you just hit and the message would disappear? .."

(staff) "..yeah that would do it.."

(researcher) "..just dead quick you press a button and the screen goes black?"

(staff) "..yeah thats it thats what we want.."

A number of systems exploring the use of situated displays have been developed previously. However, the research agenda of much of this previous work appears to be in marked contrast to our research agenda. In particular, the emphasis of previous work seems to be on the "one off" production of a proof of concept demonstrator in order to gauge technical feasibility and initial user feedback. In contrast our interest is in long term dependability. One of the key issues with the current SPAM system (indeed for all systems) is 'dependability' - the need for users to have trust in the reliability of the system, i.e. a strong belief that any SMS message they sent would (indeed) appear on the situated display and remain there for an appropriate period of time. In the case of SPAM this means having message remain visible until deleted by a member of staff.

Of course, in order to encourage users to trust the system, they need to see the system functioning correctly over a protracted period of time and achieving this kind of dependability is difficult.

Despite a long period of testing prior to deployment, reliability problems have still arisen and such problems can clearly have severe (and enduring) effects on the willingness of the user to trust the behavior of the system in the future.

The ideal situation would be to develop a system in which all components worked faultlessly or at least have an extremely long mean time to failure (MTF). However, such a situation is indeed ideal. It has been interesting to observe how some users have developed coping strategies to deal with early reliability problems. The SPAM system automatically returns an acknowledgement when an SMS message is read by a member of staff (whether the message was sent using a mobile phone or a SPAM station) and so, if an acknowledgement was not received within a reasonable time frame, the sender of the message would be expected to try again or attempt to use an alternative channel of communication.

Providing users with appropriate feedback is of paramount importance when supporting such remote interaction and is one means for tackling the complex dependability requirements inherent in systems such as SPAM. Indeed, through our development work on the SPAM system, we have discovered, at first hand, the quantum leap in difficulty of building and deploying systems that need to be constantly operational compared to the task of developing a single prototype in the lab and then giving the prototype a quick evaluation under laboratory conditions. Indeed, it was necessary to design the SPAM system such that its MTF is extremely high and that when a failure does occur the members of staff are able to make the system operational again simply by pressing the restart switch.

6. CONCLUSION: IN PRAISE OF SPAM

Man: "Well what have you got?"

Waitress: "Well, there's ...; egg and spam; egg bacon and spam; egg bacon sausage and spam; spam bacon sausage and spam; spam, egg spam spam bacon and spam; spam sausage spam spam bacon spam tomato and spam.."

Man: "Have you got anything without spam?"

Waitress: "Well, there's spam egg sausage and spam, that's not got much spam in it"

This paper has sought to identify and address some of the complex design challenges faced when trying to investigate, understand and then meet the requirements of the 'real life, real time' concerns of a complex application domain - that of community care. The (in)famous and bizarre Monty Python 'Spam' skit [16] was/is notable for that fact that whatever was ordered it necessarily included spam (and a horde of singing Vikings). In contrast our approach, in putting SPAM 'on the menu' has been to widen the available choices to hostel staff, to provide them with a resource that can be deployed or ignored according to everyday rhythms of activity and daily contingencies.

We are currently in a period of evaluation and continuing redesign. Users require time to explore fully the possibilities using and adapting to the new technologies, addressing the real problem which is the effective integration of the system with the everyday demands of this particular care setting. This process will, no doubt, lead to further refinements in our initial set of requirements and we are alert to the possibilities for 'innofusion' [7, 24] where

getting devices to work in particular user settings produces useful innovations; and 'domestication' [24] the integration of a device into everyday working practice. Our interest is in what has been characterised as 'co-realisation' [11]. Here the key issue for a re-specified IT design and development practice is therefore not only 'design' but also 'use', ensuring that user requirements that can only be identified in the context of, and through, use, are adequately captured and understood.

Our aim is to look to how 'design' emerges and evolves as part of the ongoing struggle of making *this particular system work for these particular users, in this particular workplace and at this particular time*. As Trigg, Blomberg and Suchman [21] suggest this means: "...more than engaging prospective users in the design of new computer systems to support their work. It requires that we as designers engage in the unfolding performance of their work as well, co-developing a complex alignment among organisational concerns, unfolding trajectories of action, and new technological possibilities."

We will continue to attempt to meet some of the ethical and moral dilemmas of designing in and for care settings through careful involvement and acknowledgement of users in the design, deployment, use and evaluation process. But we admit there is nothing especially novel or revolutionary about the configuration of devices used in this setting. In many ways this is exactly the point. We want robust, tried and tested applications that can be dependably deployed in a setting, left there and then reconfigured as circumstances arise - it is, as some might say, "worthy but dull". But then this is not a setting in which the designer should feel free, or even be allowed, to take risks - to play with other people's lives. And certainly it is the risks of everyday life in this difficult setting, and how the technology may allay some of those risks, that are at the forefront of staff concerns and use of SPAM.

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