Engaging with a Situated Display via Picture Messaging

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Abstract

We outline initial investigations into how choices of spatial configuration, input devices and display technologies influence action and interaction in hybrid electronic and physical spaces. Joe Blogg is a socially situated public display for receiving MMS and SMS messages and we describe our first installation of this system, giving an account of the rationale of the design concept, the installation and observations on the outcome.

Keywords
Situated display, SMS, MMS, Interaction

ACM Classification Keywords
H5 Information interfaces and presentation (e.g., HCI): H5.2 User Interfaces: Input devices and strategies H5.3 Group and Organization Interfaces: Asynchronous interaction

Introduction
Physical spaces are made meaningful to us in a number of ways - by their form and materials, by the activities that take place in them and through social interaction with co-occupants of the space [5]. Increasingly, we are now encountering hybrid electronic and physical spaces where computing capabilities are embedded into

the environment or are mobile, personal and networked – environments known as ubiquitous computing. How do we create meaning for these hybrid spaces?

'Situated action' describes the idea that actions are contextualised by the location in which they take place. This has implications for ubiquitous computing as it suggests that not only do choices about input devices and display technologies (human/computer interfaces) affect interaction but so does the spatial configuration and physical context of the entire system, including the participants.

Situated displays in the form of information boards, public notices and advertisements are common in the city. As these displays begin to incorporate electronic elements and become capable of being reconfigured by passers-by how do choices of position, input device and display technologies influence action and interaction with these hybrid electronic and physical spaces? Can these displays become catalysts for the creation of meaningful places?

We have been investigating these questions through an installation called Joe Blogg in which MMS and SMS messages are sent from mobile phone to a socially situated, public display. A critical aspect of this system is that participants and audience are implicitly co-located in the same physical environment. Joe Blogg is an initial investigation into how situated technologies might also affect behaviour of people in the surrounding physical space.

We designed the interface to allow participants freedom to direct the use and content of the system. We were interested to see if a collective sense of purpose or narrative would emerge from the individual contributions.

Related work / background

Arts practice and HCI research have explored many different configurations of mobile phone and situated displays. The phone may act as a controller [2] or as a medium for self-expression [1][4]. The display may be projected [1], screen-based [4] or tangible [2] and may be accessible to either a single participant [2] or a number of people simultaneously [1][4].

One such project is TexTales, a large-scale projected display showing up to 27 SMS messages simultaneously [1]. TexTales is built on principles of Constructionism, a theory of learning that advocates the creation of an object and reflection on the processes involved in this construction as a method for developing an awareness of thought processes [9]. Themes of co-construction are also explored by Social Tapestries where people add content to a collaborative representation of their city using handheld mobile devices [8]. This representation and the display created by participants in the Textales project can be thought of as objects for people to talk around, about and through.

When these objects are made location specific they become what Karrie Karahalios has termed 'social catalysts'. Her Telemurals project is designed to act as a social catalyst between two remote, fixed locations [6]. In contrast, Joe Blogg was designed to act as a social catalyst for people who are co-located in a particular physical space.

Design

Joe Blogg is built with Processing [10] using the Processing Net Library and Sun's JavaMail API. Content is added to the system via SMS and MMS sent by mobile phone and passed to an email address by an external SMS forwarding service. The text and picture are extracted from the email and displayed using Processing's image methods.

Situated display

Joe Blogg is designed to be interacted with at moments of 'pause' in people's daily activities. We think of these pauses as moments when people are in-between activities and so their attention is more likely to fall on their physical surroundings. Examples of 'pauses' during a typical day might be waiting for a lift, waiting for a train or travelling on public transport as well as the more obvious coffee and lunch breaks.

We chose to install Joe Blogg in the reception area of the Bartlett School of Architecture, University College London (UCL), an area in constant use by students, staff and visitors. The space is often used as an exhibition gallery and provides access to the lifts and main corridors. We positioned our display opposite the lifts to take advantage of potential moments of 'pause'.

Our intended participants for Joe Blogg were the usual occupants of the space. To encourage passers-by to interact with the system we used a large-scale projected display (approximately 2 metres by 1.5 metres) allowing people to gradually become aware of the project through observation. We hoped this would encourage observers to become active participants.

Interface

Pictures sent by MMS are shown in two rectangular areas of the display. Two areas with a darker background colour display the text messages. When a picture is received it is placed in the area on the left-hand side of the screen. If this space is currently occupied then the earlier picture will move to the area on the right hand side of the screen. The flow of images across the display aims to illustrate the rhythm of communication between participants.

figure 1: the situated display showing the most recently received picture in the top left.

Fragments of the on-screen images are copied and presented in smaller rectangular areas. These fragments are selected at random and change every 30 seconds. This continual renewal of the visual display aims to ensure that if no new messages are received for a while the interface still shows enough movement to inspire interaction with the system.

Mobile phone as input device

Our wish for the system to be socially-situated meant our choice of how participants would interact with the display was critically important. The prevalence of mobile phones suggested this was the most suitable option.

We chose SMS over Bluetooth as the means of communication as we felt it was more familiar to our audience. It also meant that while the display can only be viewed at a single location, once people have encountered the system (and noted the phone number) they can send messages to it from any place they like.

In designing Joe Blogg we prioritised picture messaging over text messaging. This was partly because the proliferation of camera phones suggested that pictures could be spontaneously taken and sent, reinforcing the situated nature of the system and partly because behaviour around the taking and sharing of pictures with camera phones appeared to be similar to the 'social catalyst' effect we hoped to achieve [7].

Early concept reactions

The system was installed for two days giving us an opportunity to observe people's initial reactions to it. During this time we remained in the reception area with the display. When someone paused at the display we spoke to them about their perception of the system.

Response to the situated display

The display was situated directly opposite the lifts. This position drew people's attention as they exited the lifts and, more particularly, while they waited for the lifts. People often called the lift then moved towards the display to have a closer look while they waited for the

lift to arrive. They would turn back to the lift on hearing the sound of its arrival. In one case, the lift's arrival was actually ignored as someone examined the display.

As the reception area is often used as an exhibition space people generally approached Joe Blogg with behaviour appropriate for a gallery. While they showed curiosity about the display there was little spontaneous interaction and we had to encourage participation by engaging people in conversation about the system.

figure 2: The 'seed' image and message

We seeded the display with a picture of Don, the Bartlett security guard who is based in the reception area, and a message with instructions for participation. Several people commented to Don about his 'new office' and this picture in particular seemed to reinforce the situated nature of the project as the content was understood as specific to this space and its occupants.

Time was implicit in many comments made about the display. People questioned whether the 'seed' image of Don was live or not and there were several comments

made by people who hadn't sent a message yet recognised changes in the display. We think that over time familiarity with the system would encourage these passive observers to become participants.

The messages
Generally the amount of interaction was disappointing though the system attracted a lot of attention and comments. Over the two days we received 8 SMS and 8 MMS messages. These came from ten separate phone numbers with four people sending two messages each. Only one person sent both SMS and MMS messages. Levels of interaction increased over the period the system was installed and we expect interaction would continue to increase if people had longer exposure to the display than was possible at this time.

All except one of the SMS messages were comments about Joe Blogg. Of the MMS messages four were taken in front of the display and the remainder were pictures already stored on peoples phones. Only one MMS message also contained text.

The sending and displaying of pictures elicited far more delight from participants than the sending of text messages. Several people sent pictures they took of the reception space as if testing the synchronicity of the system. The appearance of these images on the display generated the greatest delight and demonstrated the importance of low latency.

Response to the use of mobile phones as input
We thought that the ubiquity of mobile phones and the commonality of text messaging would overcome many of the issues around social embarrassment and motivation raised by Brignull and Rogers [3], but this

was not the case. The fear of doing something wrong both inhibited participation and led people to compare their messages with those sent by other participants.

The decision to use SMS rather than Bluetooth made it possible for people to interact with the system in a variety of ways. While some people sent their messages standing in front of the display, an equal number of people communicated with the display from other locations around the building. Each time this occurred they returned to the display within a few minutes to check their message had arrived. This suggests the messages were sent in idle moments, reinforcing our idea that these interactions are most likely to happen at times of pause.

Unexpectedly, the cost of sending MMS or SMS messages was not mentioned by anyone who participated or observed the system. The only comment that suggested cost might influence interaction was a description of a phone as being 'generally one-way' by which they meant their phone is pre-paid and they didn't often have credit on it.

A far greater barrier to picture messaging seems to be the complicated procedure for enabling MMS services required by many UK network providers. A significant number of people tried to send pictures to the display only to discover their phone was not set up for this.

Future directions
Before proceeding with any further developments it is obviously necessary to install the system for a longer period of time to see if spontaneous interaction increases as familiarity with the system grows.

Changes to the interface might reveal the effect of different designs on participant's interaction with the system. We plan to explicitly reference the passing of time through the visual representation of the messages as well as experimenting with different 'seed' images.

Giving the project a theme or topic might be an effective way to encourage interaction. One possible framing we are considering is a game where the implicit competitiveness might facilitate and sustain interaction.

The co-location of participants and display initiated some unexpected interactions. The ability to send a message to a situated display from remote locations seems an interesting feature for future exploration.

We plan to use people's incidental movement through the space as a trigger for the system to try to initiate a 'conversation' with the audience through text or audio communication.

Conclusion

In conclusion, our preliminary observations suggest that while picture messaging has the potential to engage participants with a situated display there are many contextual and interface factors to be considered. The location of the system, the motivation and reward for participation and the interface design all influence participants spontaneous interaction with a situated system. Despite these difficulties we feel this is an area worth investigating further.

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