

# User Problems - Design Solutions

## Swarms for Nomads

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### ABSTRACT

This paper draws on the findings from a qualitative study into the impact of mobile phones on youth culture. It outlines the user problems that emerged and the design solutions that were implicated. It then looks at how the 'scenario prototype' for the Swarm phone was developed in response to these emerging user needs. The Swarm phone is currently being developed by the technologists for the Smart Internet Technology CRC and the final section of the paper looks at how continued interaction with users has contributed to the design process.

### Keywords

Scenario prototypes, virtual presence, social communication, mobile phones, avatars, swarm, nomads.

## 1. INTRODUCTION

Mobile phones are becoming the preferred way for young people to stay connected with each other. Real life social networks have gone digital, or more specially, require a digital component to flourish. In this sense, the virtual world controls the real world, but at the same time is merely an extension of it. Therefore, mobile facilitated, virtual interactions must compliment face-to-face friendship networks. This has been discussed in-depth, see [1] [3] [5] [6] [7] [10] [11] where it can be seen how mobile phones play a big part in helping young people achieve their social and cultural goals. This paper proposes that successful designs of mobile phones for young people must respond to studies of the ways in which real life friendships are formed and maintained through mobile interactions.

## 2. THE USER STUDY

The user study, called the Young People study, is a qualitative analysis of 29 young people living in Melbourne, Australia aged 18-27. An open-ended interview method [9] was used. The data was analysed using NUD\*IST 4, a computer program for the analysis of qualitative data.

## 3 USER PROBLEM : DESIGN SOLUTION

### 3.1 Emerging Theme: The user archetype: the nomad

A distinct archetype of user emerged from the study – the nomad. Twenty-six of the 29 participants in the study can be described as nomads. The nomad is characterized by always being on the move - between different groups of friends, one or more part time jobs, university, shopping, going to restaurants and bars, a boyfriend's or girlfriends house, a share house, parents' houses and activities such as participating in a sport. Furthermore, users in the study are nomadic in the sense that unlike previous generations they do not have centralized meeting places where they can get together such as the main street or the mall. Groups are formed spontaneously on a minute-by-minute basis. Thus even though the 26 users are disconnected physically they are connected virtually, because their mobile phone allows them to move between a wide range of social groups and activities with ease and fluidity.

*User Problem:* Young people are living increasingly fragmented lives; however, it has been shown that mobile phones can provide cohesion by providing a virtual space where interaction can occur. How can a future mobile phone do this more efficiently?

*Design Suggestion:* The Swarm is a virtual lounge room that resides on a mobile device. It is always on. The user is represented in their virtual lounge room by an avatar. The avatar represents the user as being engaged in a specific activity. This allows the user to maintain a constant virtual presence. The Swarm provides the user with a virtual home base on their mobile phone so no matter where they may be physically they are still in one place digitally.

### 3.2 Emerging Theme: Twin desires of fluidity and control

For the young people in the study technology and friendships are inseparable from each other and users report that without their mobile phones they simply would not have access to their friends. They desire the fluidity that their mobile phones allow them – being able to come together with different friends and activities with ease. Users were concerned however, that their mobile phone allows them to be contacted at any time. Of the participants in the study, 26 say they are very careful about

policing the boundaries of the social worlds that they created through mobile phones. Half the participants do not answer a call if they do not recognize the caller, despite the fact they have to pay twice - once to retrieve the message and then again to call the person back. Furthermore, 23 of the participants say there are times when even if they recognize the caller they would rather let the phone deal with it.

*User Problem:* Users want connectivity at all times. However, this does not mean they want to be contactable at all times. A mechanism needs to be put into place that allows users to have control and fluidity over the virtual space that the mobile phone creates.

*Design Suggestion:* The Swarm provides a virtual lounge room that is the first point of contact for visitors to the phone. An avatar of the user meets visitors. Visitors to the phone can see what the person is doing without having to talk to the person. Note that the ability to not be contacted is as important as the ability to be contacted. This level of control over virtual space is at the center of The Swarm.

### **3.3 Emerging Theme: User want to be able to communicate a specific message to callers without having to actually speak to them**

Twenty-four participants in the study agree that even when a phone call is not answered, the status of the phone itself reveals a lot about the current availability of the user. For example, a phone that is switched off indicates that the person is not in social interaction mode. A phone that is turned off mid-ring indicates either that the person is engaged in an activity where it is not appropriate to talk, or may indicate a deliberate rejection of the caller. A phone that rings out or goes to voice mail is seen to mean that the person is willing to be contacted but cannot get to the phone at that particular moment. It is an indication to try again soon. One user states,

Sometimes it is nice to just go out of circulation. When I want to do that I just turn my phone off and people that call see that my phone is off and can tell that I am not interested in catching up. The problem though, is sometimes my phone goes flat and I end up sending the 'out of circulation message' when really I am just out of battery.

Twenty participants respond that they would like this concept of conveying meaning without having to directly communicate to be developed further.

*User Problem:* Both sender and receiver of calls would like to have the option of conveying a message without having to actually speak to each other.

*Design Suggestion:* The first thing the visitor to the phone sees is an avatar that represents the user as being engaged in a specific activity. This means the owner of the phone can convey something to a visitor without having to talk to them. Avatars are not taken literally but rather allow for an iconic

representation of what the user is doing at the time. For example, an avatar of the owner of the phone wearing a suit and holding a briefcase indicates that they are in a meeting, while an avatar of the owner wearing a cocktail dress holding a martini glass indicates that one is 'out on the town'. The Swarm comes with an initial selection of avatars and more can be downloaded from the Internet. In order to provide further clarification, voice tags can be attached to the avatars. The Swarm can also provide people with a time framework as well in that a 'watching a movie' avatar would indicate the person is only busy for a few hours, where as a 'skiing' avatar would indicate the user will be gone for a greater length of time.

### **3.4 Emerging Theme: Mobile phones are central to identity**

The young people in the study use different technologies to facilitate different activities and their choice of the technology is an expression of their identity. This is supported by Carroll et al who find that phones are integral to young people's sense of identity. They state, "ICTs enable young people to establish an identity or sense of belonging." [3]. One user in the Young People study states, "The way I use technology or bits of it is dictated by what and how I want to communicate things, how I want the message to get across and who I am sending it to." Another states, "The type of message you send says as much as what's in the message." The Young People study also reveals that for the users in the study their choice of how they send and receive a communication message is one of the most important ways they can express their identity to their peers. However, identity is multiplicitous and shifting rather than singular and static and users want the freedom to express themselves according to context of the exchange, the environment they are in and the nature of the relationship with the person they are communicating with.

*User Problem:* The challenge for designers is to create a mobile artifact that allows the user greater freedom to use their mobile phone to express themselves. Therefore, a mobile phone needs to be robust enough to allow the user to construct different identities in a range of contexts.

*Design Suggestion:* The Swarms' virtual lounge room supports multiple avatars that represent the users' multiple identities. The user can set up the avatars so that they can simultaneously convey different meanings to different people. For example, one avatar conveys professional identity and the other a social identity. This means that users can allow the boss to see the 'in a meeting' avatar while the best friend sees the 'shopping' avatar!

### **3.5 Emerging theme: Producing and sharing content is an important part of how young people share experiences**

For 26 participants in the study, mobile phone ownership goes hand in hand with a need to regularly update others of their actions - to document and circulate their experiences. There is a sense that an experience is not complete until it is shared digitally through text, voice or images. Through this sharing, of

what is essentially content, friends are able to maintain a presence in each other's lives. When members of a social group cannot be together physically, circulating digitized accounts of an activity become an authentic way to share the experience. Furthermore, once sent, the message often has value for the receiver. Sixteen users in the study say they archive significant or sentimental messages and images in their phone.

*User Problem:* How can a mobile phone meet users' needs for more sophisticated facilities to share their experiences through the production, distribution and display of content? It is also important for the content to be protected and successfully archived because it can have great sentimental value.

*Design suggestion:* The Swarm, which has picture and video capabilities, allows the owner of the phone to capture and display 'up to the minute pictures' on the 'walls' of their virtual lounge rooms. By doing so the owner of the phone is able to customize the look of the room and make it reflect a continual digital representation of their real life. This can act as an incentive for those not present to join them or allows for those who cannot be there to 'get the picture' There is also a need for a remote archive that can store massive amounts of data and, provide an appropriately safe place for backing up precious content.

### **3.6 Emerging Theme: Protection rather than privacy is a big concern in relation to content**

The participants in the study do not express a great concern for privacy and security. They want control of the boundaries of their virtual worlds in that they do not want to have to indiscriminately field text messages and phone calls all the time, but this is more about not being inconvenienced than it is about infringement. It is surprising then, when participants say they feel very strongly about the protection of their content. Of the six users who have a security code on their phone, only two have it primarily to stop other people using the phone to make calls. The other four have the security code activated to protect people from looking at their texts and images. One of these users says she guards her text messages more closely than she does her Internet banking.

*User Problem:* The study indicates the importance of protecting who can access, add to, or edit their content. What effective but realistic mechanisms can be put in place to ensure that the user can control visitors' access?

*Design Suggestion:* Ideally, the intelligent agent that operates within The Swarm to process visitors and manage the avatars will be able to authenticate visitors to the phone and then admit them accordingly.

## **4. TRANSLATING USER STUDIES TO DESIGN**

The design solutions outlined above were then transformed into a 'scenario prototype' [10] which is like a traditional scenario that communicates user needs to designers [2] [4]

except that a 'scenario prototype' is more design solution specific.

The scenario prototype essentially told the story of the archetypical user – the nomad, employing an ideal imagined technology – the Swarm phone, to achieve the social and cultural goals (uncovered in the study) more effectively than current technology allows.

In order to ensure rigour the scenario prototype was taken back to seven users in the study. It should be noted that the Swarm scenario prototype generated a lot of user feedback, providing a means for the users to reflect further upon their own behaviour. This indicates the effectiveness of scenario prototypes not only for communicating with computer scientists but as means for gathering extra user requirements thereby filling in the gaps left by the open-ended interviews. This was supported by Wixon who stated that "different qualitative methods tend to complement each other, and other approaches. When the results gathered from different techniques point to similar conclusions, our confidence in the conclusions is increased [12].

Interaction with users has been embedded in every stage of the proceedings of developing the Swarm phone and the scenario prototype was modified by the users in the original study many times. For example, as outlined above the users' initial desire was to be able to control who called them and when, this led to the development of avatars so that a digital representation of could be programmed to act for the user. Yet when revisiting the scenario five users stated that while this level of control was a desirable feature - it should be just that - a feature. There were times when you wanted a lot of control over who called you when but at other times you didn't want to have to have that level of involvement with the phone [10]. Hence, the Swarm is now being modified with the addition of a default mode that indicates the user as either at work/university/school or at home. Furthermore, in order to better meet this user need of not having to always be telling the phone what to do, avatars such as the 'watching a movie' avatar are 'exploding avatars' in that they expire after two or three hours and revert back to a default mode so the user doesn't have to remember to deactivate them.

The next stage is to give the physical version of the Swarm back to the participants in the study. It is hoped that this participatory design approach creates a space where all those involved with the development can come together to make sure that the user experience is continuing to contribute to the design process.

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