

Grounding Experience: Relating Theory and Method to Evaluate the User Experience of Smartphones

David Swallow

Department of Computer Science
University of York
England
swa110w@hotmail.com

Mark Blythe

Department of Computer Science
University of York
England
mblythe@cs.york.ac.uk

Peter Wright

Department of Computer Science
University of York
England
pcw@cs.york.ac.uk

ABSTRACT

The field of Human Computer Interaction (HCI) has become increasingly concerned with user experience. A variety of theoretical accounts of what experience is have been articulated in recent years which offer a number of important insights but it can be unclear how they inform design. While they stress the importance of aspects of experience such as anticipation and reflection they seldom offer data collection or analysis techniques, nor do they demonstrate how such data can be related to the design process. This paper examines several techniques to analyse and evaluate user's experiences of interactive technology and demonstrates how a grounded theory approach can be used to generate design ideas. The paper presents three evaluative case studies of user experience with the Orange SPV E200 "Smartphone".

Keywords

User Experience, Theory and Method, Data Collection Techniques, Evaluation, Case Studies, Ubiquitous Computing,

1 INTRODUCTION

For many of us, information and computing technology is not only an everyday part of our working and home lives it is something we carry around with us wherever we go. Although the task-based, goal-oriented design objectives of efficiency and utility are still important in Human Computer Interaction (HCI), there is an increasing focus on aesthetics, enjoyment, creativity, in short, a much wider conception of user experience. Recent theoretical articulations of user experience demonstrate that it is a complex and difficult concept that is hard to exhaustively define [e.g. 5,6,10,14]. Given that experiential factors are difficult to map, let alone measure, the challenges of experience-centred evaluation and design can seem daunting.

The new generation of mobile phones is a good example of the ubiquity of computing technology and the focus on enhancing user experience. Research on mobile phones has mostly focused on problems such as creating an efficient interface, developing a usable system on

which to base the technology, and establishing technology that is not dependent upon a high degree of user expertise [e.g. 2, 8, 9, 13, 17, 20]. There have been far fewer studies of mobile phone technology in terms of experience-centred design [e.g., 1, 19]. Focusing on the Orange SPV E200 "Smartphone" – the first mobile phone to operate on the Windows Mobile software platform - the impetus for this investigation was to develop a means of collecting and analysing empirical data concerning the user experience of smart phones.

1.2 Theoretical Accounts of User Experience

Over the last five years there have been various attempts to provide a comprehensive theory or framework of user experience. Whilst a number of these attempts have approached the concept by drawing heavily upon cognitive science [10, 11, 12, 16] others have adopted a more holistic, phenomenological approach [6, 5, 14] but all are concerned with the analysis of sensations and emotions as well as perceptions and behaviours. The diversity of these approaches is perhaps not surprising given the complexity and richness of user experience. There are, nevertheless, a number of common issues and themes that run through these varying accounts. For example, qualities such as engagement, fulfilment and fun are generally regarded as forming an important aspect of user experience. A common strategy in the literature is the reduction of experience into a number of factors or processes [e.g., 10, 16]. Such approaches may be useful for experimental analysis but they can miss some of the insights available in accounts that resist such reduction [5, 14].

McCarthy and Wright [14] offer a relational account of experience that engages with the individual in culture. Their account of technology as experience recognises that experience always takes place in the context of a remembered past and an anticipated future, it is coloured by the stories that we tell others and their responses. This kind of approach presents challenges concerning appropriate research methods. This paper suggests a number of research techniques suitable for the generation of rich experiential data. It takes a

grounded theory approach to three in-depth case studies of the Smartphone. It identifies experiential categories and illustrates them with conceptual designs. These conceptual designs are not proposed as working solutions to the problems identified, rather they are intended to illustrate how such an approach relates to design issues.

2 TECHNIQUES FOR EVALUATING USER EXPERIENCE

Qualitative data provides a richness and detail that may be absent from quantitative measures. One of the most useful qualitative research methods available is the case study, which focuses upon only one or a few instances of the population or situation under investigation. Advocates of this approach argue that while statistical methods might be able to deal with situations where behaviour is homogeneous and routine, case studies are necessary in order to account for creativity, innovation, and context. Although findings cannot be generalized, insights may be gained that have wider implications, and data may be revealed that would not have come to light through a more widespread investigation [18].

Three in-depth case studies were conducted in this investigation. Participants were loaned a Smartphone for the three-week duration of the study. *Anticipation* and *Reflection* interviews were carried out at the beginning and end of the study respectively; the participants were selected through *persona matching*; tasks and activities were based on the Orange advertising scenarios and *do something challenges* data were recorded in *voice note diaries* and recorded interviews. The following sections provide details for each of these techniques.

2.1 Persona Matching

In order to design for specific users as accurately and effectively as possible, Cooper [4] advocates the use of *personas*, which are “*hypothetical archetypes*” of actual users through which designers can “*develop a precise description of [the] user and what he wishes to accomplish*” [4, p.123]. For the benefit of potential SPV E200 Smartphone customers, who might be asking the question “*What can the SPV E200 do for me?*” the mobile phone company Orange has provided on their website several persona-based examples of how typical SPV E200 owners use their mobile phone. Conveniently managing to highlight every single feature of the device these “*real-life stories*” are documented as a number of scenarios in the lives of “Louise”, “Jill” and “Miguel” – student, mother of two, and exchange broker, respectively. From taking a picture of friends going wild on the dance floor, to emailing the latest share price to a colleague, the SPV E200 is portrayed as an extremely flexible and desirable device that is suitable for a whole

range of different users and uses. It is likely that these personas were marketing afterthoughts – they changed shortly after this study, but it was felt that they would be a good starting point for recruiting participants. Participants, then, were recruited to resemble as closely as possible, the demographic features described in the Orange personas.

As well as providing a demographic basis for the case studies in the current investigation, the Orange SPV E200 persona also provided scenarios of use, upon which specific tasks could be based. For example, the website presents a short story in which the mother of two, “Jill” uses the task list function of her SPV E200 to organise a children’s birthday party, takes a picture of her children using the integrated camera, and then sends the pictures to her husband via a multimedia message. Similarly exchange broker, “Miguel” synchronises the calendar and contact details of his SPV E200 with those on his PC before checking a share price on the device and e-mailing it to a colleague. These scenarios, although presumably selected to promote the various features of the device, provided a number of circumstances on which to base the specific objectives to be carried out by the real-life equivalent of each persona. This “*persona matching*” provided both a relevant user demographic and an appropriate selection of tasks. While such a technique is dependent on the marketing decisions made by the promoters of a particular product or service, it questions rather than accepts the claims that those marketers make.

2.2 Do Something ... Challenges

The main drawback to the marketing scenarios was the goal-based nature of the activities described. The resulting tasks would be likely to capture usability issues but would not adequately map non-task based aspects of the user experience. In order to supplement the task-based assessment of the Orange personas with a more flexible, user-directed evaluation of user experience, “*Do Something ...*” challenges were developed. Inspired by Cultural Probes [7], the technique required the individual participants to use their imagination in an open-ended exercise designed not only to promote the use of the mobile phone in inventive ways, but also to encourage reflection on the feelings and emotions that are evoked by using the device.

From an extensive list of emotional adjectives, the participants were required to make a selection of five and carry out certain activities with their mobile phone which they felt were representative of such a description (e.g. “*Do something... funny / sexy / daring / surprising / relaxing / ...with your mobile phone*”). The choice of adjectives, and the means by which they were carried

out was completely up to the user, who was free to make their own interpretation. This approach complemented the goal-orientated tasks, allowing the concept of user experience to be more thoroughly explored.

2.3 Voice Note Diaries

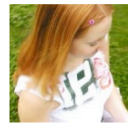


As well as being the focus of the current investigation, the SPV E200 mobile phone itself was used as a means of collecting data. Mobile phone use is to an extent, unplanned, occurring at any time of day, user experience is therefore unlikely to be captured *in situ* through the use of traditional interviews. However, by exploiting the Voice Note function of the SPV E200, this investigation allowed users to swiftly and conveniently record their experiences *with* the mobile phone *using* the mobile phone. As with the voice-mail diary study by [17] the use of Voice Notes proved to be extremely successful in capturing information as naturally and spontaneously as possible. Miguel commented that he “*was far more likely to use it rather than writing something down on a pad*” and that the need for no additional equipment meant that it was much easier to make spontaneous recordings. Recording voice notes in public with a phone is inconspicuous as it looks like taking a call or leaving a message. The time stamp and background noise on each of the recordings indicated that the majority of Voice Notes made by the participants were recorded spontaneously in different locations at various times of the day.

2.4 Anticipation and Reflection Interviews

Anticipation and orientation have been identified as central elements of user experience [e.g., 14] for this reason participants were interviewed about their general attitudes to technology and mobile phones. They were also asked to respond to the marketing images on the packaging when they were given loan of the Orange SPVs. There was also a concern with previous and current uses of other technology and the interviews drew on the participants’ technology biography [3]. The stories we tell one another, the narratives we form about our experience have also been identified as crucial elements of our experience and so participants were also interviewed about their overall impression of the phone some weeks after they had returned it to the researcher. Table 1 summarises the participants’ demographic details using the descriptions of the Orange personas and notes whether they accomplished the tasks based on the marketing scenarios and reports whether they enjoyed them or not, it also records their choices of “do something” challenge.

Table 1. Persona matched participants; tasks taken from the Orange scenarios; task completion and enjoyment; choices from the “do something....”

challenges.

Persona Characteristics	Persona Matched Task	Task Completed?	Task Enjoyed?	Do Something Choices
 Louise, 20, Student	Download film trailer	✗	✗	"FUN"
	Use MSN Messenger	✓	✓	"TOGETHER"
	Personalise SPV E200	✓	✓	"LOVING"
	Download game	✗	✗	"BORING"
	Show to a friend	✓	✓	"ANNOYING"
	Download MP3	✗	✗	
 Jill, 42, Mother of two	Take a picture and e-mail it	✓	✓	
	Use Task List	✗	✗	"NEW"
	Send an SMS text message	✓	✓	"YOU ARE PROUD OF"
	Use integrated camera	✓	✓	
	Organise gallery	✓	✓	"FRUSTRATING"
	Send a picture via MMS	✓	✗	"SILLY"
 Miguel, 26, Exchange Broker	Send a Voice Note via MMS	✗	✗	"ANNOYING"
	Synchronise phone with PC	✗	✗	"FUN"
	Use Internet Explorer	✓	✓	"NEW"
	Send an e-mail	✓	✗	"FOR SOMEONE ELSE"
	Use the speaker phone	✗	✗	
	Use the calendar	✓	✓	"ALONE"
	Use MSN Messenger	✗	✗	"BORING"
	Back up the phone to the PC	✗	✗	

3 FINDINGS

The qualitative data analysis software QSR NVivo was used to analyse the raw data generated by the techniques outlined above (including Voice Note transcripts, interview transcripts, and other documents and materials). This was in accordance with the “grounded theory” technique [18] whereby the key components or general principles that are assumed to underlie a phenomenon are “discovered”, and a number of categories, concepts and properties, as well as interrelations between each of them, are identified. User experience has yet to be as thoroughly investigated as usability and it was unclear exactly what was to be gleaned from such an investigation. Certainly, there were themes and issues to be investigated but unlike usability studies, where a precise hypothesis can be made and subsequently tested, there were no precise goals that could be used to guide the investigation of user experience. The grounded theory technique then was a particularly appropriate means of analysing the data because it is the data itself that directs the course of the investigation. It must be noted that for the purposes of anonymity, and also to facilitate direct comparison, the participants in this investigation have been given the same names as their equivalent Orange persona.

3.1 Identity

One of the most pervasive themes throughout the investigation, which is also widely recognised in the recent literature on user experience [e.g., 16], was that of identity. Information and computing technologies have an impact on our private identity in terms of how we express ourselves through them; they also impact on our public identity in terms of how others perceive us.

For example, in their technology biographies, Miguel, Louise and Jill each referred to the desktop wallpaper on their computers which, due to only being seen primarily by the user themselves and very few others, provided a personal and private expression of identity.

For Miguel the choice of his existing mobile phone was influenced by the image he wished to portray to others. *“didn’t fancy the Nokia look, with the multi-coloured console on it. I wanted something that looked business like so I bought this little grey thing with a fold down flap, a ‘Fox Mulder’ effort. It was probably a posing factor.”* The humorous aspect of customisable ring tones was also exploited in order to make an audio statement *“having Colonel Bogey ringing out at work...seems highly appropriate.”*

The participants were concerned then with what the phone said about them in terms of how it looked and sounded, but there was also a concern with what phone use meant in terms of social etiquette. For Jill, the mobile phone was an important means of keeping in touch with others, and consequently its use in public places was deemed perfectly acceptable. Even in places like restaurants where she knew its use was potentially annoying to others, she justified it in terms of keeping in contact with the babysitter. Jill’s role as a supermarket checkout operator meant that she came in contact with other members of the public on a regular basis, and only here was mobile phone use seen as unacceptable: *“What really irritates me is when I’m serving a customer, and their phone goes off and they carry on talking. I think that is so rude. They’re talking and giving me change with the phone stuck to their ear. I don’t like that. It really annoys me.”* Such perceived rudeness or impropriety heavily influenced Miguel’s use of the mobile phone; unless absolutely necessary, he was *“reluctant to use a mobile phone when standing in the street because I don’t like the image of people walking along with them.”* Here, the image that is conveyed by mobile phones takes precedent over their practicality.

As any new technology is adapted it impacts upon custom, manners and etiquette; while it is a marketing truism that the look of our mobile makes a statement about ourselves (a recent advertising campaign asked “are you ashamed of your mobile?”) we also establish personal and public identities through patterns of use.

Designers have long understood the expression of identity through personalisation but phone etiquette is less often considered in such terms. Most phones are sensitive to location (trains, cinemas, supermarkets and so on) only in terms of their on and off switch. Making phones more location sensitive might be a worthwhile design challenge not only in terms of making them less annoying [15] but also in terms of making them better express certain conceptions of self.

3.2 Sociability

Unsurprisingly, considering its purpose as a tool of communication, the user experience of the Smartphone in these case studies was strongly intertwined with issues of sociability. As well as conveniently facilitating the organisation of a night out, the text message also provides a certain confirmation or “proof” of an arrangement that is more tangible than a transient call. When referring to texts of this nature, Louise admits *“if someone has agreed to something in them, and I’m scared they will drop out, I keep them just for proof.”* It is the use of text messages to “drop out” of an agreement or to cancel an arrangement that is strongly disapproved of by many users, due to the impolite evasiveness of such an act. When a friend dropped out of going to a University Ball, Louise’s disappointment was compounded due to the means by which she was informed: *“She let me know via text, which I was very annoyed with. I tried ringing her, but she said she didn’t want to talk because I would have a go at her! She told me to text her to tell her what I thought.”* This is reminiscent of Taylor and Harper’s [19] study of teenage mobile phone users, in which the canceling of the ultimate arrangement – a relationship – via text, was regarded as *“the most contemptible use of the technology”* [19, p.443].

Another benefit of communicating via text message was the asynchronous nature of such a facility. Jill noted that *“they don’t have to be there, as when you use the phone to ring someone. If they are not there you can still text.”* The device then evokes a sense of security and connectivity. As well as providing a general sense of connection, which may or may not be desired, the sociable aspect of mobile telephony can also bring about a certain affinity amongst specific groups of individuals. For example, after using the Smartphone for the period of the study Miguel reflected that he *“gained a certain connectivity with the people with whom I go out with of an evening because they use their mobile phones an awful lot”*. Conversely, Jill’s indifference towards using the SPV E200 for sending photo messages stemmed from an awareness that her friends would be unlikely to be able to receive them on their technologically incompatible handsets. Jill declared that the only numbers that she stored on her mobile phone were those of her close friends and family. Although she conceded that the addition of contact details for services, such as taxis or doctors, would be extremely useful, she was reluctant to extend her contact list beyond the immediate members of her private circle. Louise however, proved to be rather more lenient in her contact list criteria, citing the contact details of her local restaurants, taxis, and place of work. Going a step further, she also confessed to having included the contacts of people that she no longer wished to speak to,

so that *“it will display the name of who it is when they call me”* thus allowing her to avoid any unwanted communication.

For her Do Something ... challenge Jill’s used her Smartphone to send a humorous image to a friend. The picture in figure one is a close up of Jill’s finger and thumb though it might look at first like something more risqué.

Figure 1: Louise’s picture message



This use of the Smartphone illustrates the increasing importance of mobile telephony in activities like flirting. Socializing of this sort could be further exploited through an extension of existing technology. Not only could mobile phones maintain social groups, they could also provide the means of creating them. If the device could be programmed to store a “profile” of the user, which contained various information such as their hobbies, interests or even their marital status, this could be beamed via Bluetooth technology to other users in the vicinity in order to alert them of someone with similar interests to them. It is possible to imagine such a feature being exploited in a singles night at a bar where a virtual personal ad might allow for the connection of disparate users who might otherwise have remained passing strangers. Clearly such an application would pose a number of problems in terms of security and privacy and it is suggested merely to illustrate how such concerns can relate to design.

3.3 Security

Given the ubiquity of the mobile phone, which acts not only as a status symbol but also a significant means of communication, a number of important security threats and concerns are inevitable. Smartphones could put users at greater risk, not only in terms of the loss of confidential data stored on such devices, but also in terms of the monetary value of the actual handsets, which are a potential target for thieves. This was an important consideration for Jill, who revealed that she usually kept her phone hidden away because *“I don’t like it being on show. If it is left out, it could get stolen so I keep it in my bag as a safety precaution.”* Although the image conveyed by such an expensive device was one of the initial benefits identified by Miguel, the security implications of owning a SPV E200 were of prime concern to Jill, who admitted: *“I was worried about losing this phone to be honest, that’s why I*

wanted to give it back. It’s a hell of a responsibility carrying that thing around.” During the reflection interview one of the reasons that she gave for not wanting to own such a device was that she would *“hate carrying around something so expensive”* and that it would be *“alright as long as I had it hidden and not open to public gaze [...] I read about people getting mugged for their mobile phones, and for a while I was a bit conscious about using it in the street. I tend not to be too bothered about it nowadays. Everybody seems to have a phone, or is able to get one, so I’m not too worried about that anymore. Plus phones are usually insured.”* Evidently, the desirability of the SPV E200 is perceived to be two-fold, appealing to both image-conscious users and opportunist thieves alike.

Although a number of security-related drawbacks can arise from carrying a mobile phone such a ubiquitous device can also provide immense reassurance to certain individuals. Having been delayed by traffic on a trip to Miguel found *“it was very useful to be able to ring ahead to say that I would be later than expected”*. He also added that *“it might be more useful if I was out and I’d missed the last bus, particularly if I were female.”* This was indeed one of the benefits of mobile phones expressed by Louise who found that *“when I’ve been walking in the dark, and no one else is about it’s been nice to have.”* Although Jill was somewhat indifferent towards using the mobile phone at home, often choosing to switch it off, she admitted that *“I do take it with me when I leave the house. In fact, I always have it with me when I go out”* and also *“when I’m going out in the car on my own, I like to have it with me more or less as some reassurance.”* Jill however, chose to carry the SPV E200 around with her wherever she went, although not for reasons of personal security. Instead, it was the cost of the phone which made her feel *“as though I’ve got to take it everywhere with me because I am frightened of losing it.”* Although manufacturers may currently emphasise the reassurance that is experienced by carrying a mobile phone, they might also consider the sense of responsibility that is evoked by such an expensive item of technology.

As has been discussed previously, the mobile phone provides an important symbol of status to certain users, which is at the root of such security concerns. Perhaps if measures were taken to somehow make them less of a status symbol, this would reduce their desirability, resulting in greater security for the individual. It would however, conflict with the objectives of mobile phone manufacturers who heavily promote the ostentatious appearance of each device, in order to appeal to image-conscious users. In order to resolve this dichotomy, designers might wish to exploit the customisability of such devices. Fascias are currently designed to make mobile phones appear more desirable, so as to create a particular image and identity; they could also be made

to make them appear less desirable, very standard and unremarkable, in situations where the desirability of the device may make pose a significant security risk.

3.4 Organisation

Modern mobile phones, including the SPV E200, incorporate a number of facilities that allow the user to organise their lives. These include; a simple calendar, a to-do list, a schedule planner, e-mail facilities and synchronisation with desktop PCs. Such facilities appear to be primarily intended for use in business situations – a fact that did not go unnoticed by the users in each case study. One of Louise’s initial comments about the SPV E200 was that the “*No Upcoming Appointments*” message that is displayed upon the homepage of the device made it feel “*more like a business person’s phone*” and that she didn’t “*particularly have a busy enough schedule for that sort of thing!*” She also made the point that “*it’s a bit of a fuff to put [organisational information] on the phone*” – the relatively small screen coupled with the need to enter everything via the alpha-numeric keypad making data entry laborious. Similarly, Jill preferred to use her traditional paper-based calendar. They did not perceive the degree of business-style organisation they required to be sufficient to warrant the use of a mobile phone. In contrast, being a business man, Miguel greatly appreciated the calendar function of the SPV E200, and commented that “*during a busy day at work, the ability for the phone to send out a call sign, perhaps fifteen or thirty minutes before an appointment or a meeting is very useful to remind you and takes away the stress of having to remember such things when you are very busy.*”

As the amount of processing power increases, producing efficient organisational tools will become easier. But a key design challenge will be to make such tools simple to use and relevant to the users needs. This reinforces the argument that good usability is foundational to good user experience. Although calendars and reminders are already present in mobile phones such as the SPV E200, offloading more organisational responsibilities onto the device itself could further enhance these features. When arranging a meeting or appointment, users could simply allow their mobile phones to communicate the users’ schedules with each other in order to establish a mutually convenient time. This notion will be returned to critically in section four.

3.5 Relevance

Common throughout the four distinct themes of identity, sociability, security and organisation is the concept of relevance. Relevance was an important consideration for each of the participants in the current investigation, whose opinions of the SPV E200 seemed to hang on whether or not the device was appropriate to them. This was immediately apparent from Jill’s verdict on the SPV E200, in which she declared “*it’s far too*

complicated for me. Not very straightforward. I mean it’s good when you get into it, but it takes a lot of effort and is just far too complicated for my needs.” For Jill, who leads a busy life balancing a part-time job and looking after her two young children, time is extremely precious. Jill remarked “*I feel the phone is suited for a businessman or a professional, but not for someone like me.*” A similar sentiment was shared by Louise, who despite becoming reasonably adept at operating the device and praising its various features concluded “*I don’t think this is really my sort of phone.*” she felt it to be more appropriate to a businessman than a student.

Even in the role of a business tool however, the SPV E200 was of little relevance to Miguel, who, after the initial novelty of using such a device, noted that “*all the bells and whistles that are on this phone are interesting, and a novelty at first, but I have soon found it has taken up residence next to my old phone in my bag and is used very rarely.*” He did however concede that the SPV E200 “*could certainly be a useful business tool if I was keeping it, and it was my own phone*” although he considered the organisational aspects of the device to be much more relevant than such “*gimmicks*” as the integrated camera.

Instead of attempting to create products that appeal to a wide range of users and, consequently, only partly satisfying each of them, designers should perhaps target their creations towards a much narrower segment of the market, thus resulting in much greater satisfaction [4]. Such an approach would substitute the multi-functionality of the Smartphone for a range of devices that are appropriate to specific users. While it is possible to delete applications from the Smartphone the procedure for doing this is relatively complex. The phone then is adaptable and can be personalised but it is not aimed at specific users. Monk (2004) made a radical modification of the Orange SPV to turn it into a two button phone which displays pictures of people in the address book with yes or no options for calls.

Figure 2: Andrew Monk’s 2 button phone
<http://www.cuhtec.org.uk/resphome.html#mobile>



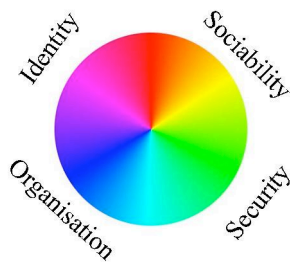
Such a design would have an obvious appeal to older users with failing eyesight, arthritic conditions and procedural memory loss. By sacrificing the economical advantages of designing a single product in favour of satisfying a wider range of users, mobile phone manufacturers might achieve a much greater degree of

product satisfaction than they would by attempting to suit all users with a single “smart” device.

4 A RELATIONAL APPROACH TO GENERATING DESIGN QUESTIONS AND CHALLENGES

The grounded theory analysis identified four key experiential categories in relation to the Smartphone: identity, sociability, security and organisation within the super ordinate category of relevance. The four experiential categories are of course closely linked and can be thought of as blurring at the edges. Although they are not diametrically opposed there are sufficient tensions between them to generate design questions and challenges. Although it would be possible to make an axial representation of the categories this would suggest polarisation. Given the holistic, relational approach to experience taken here, a more appropriate representation is the colour wheel below.

Figure 3. Experiential Colour Wheel



The colour wheel is an appropriate representation for design ideation because unlike Venn diagrams or lines of axis it does not suggest bounded categories, rather it defines a contoured, continuous space and encourages one to explore how one division blends into and relates to another. Each of the categories impact on one another in different ways and so a consideration of each in relation to the other yields different and more complex, nuanced design questions and challenges. To take just one example, consider how the design issues around the category of identity change when it is considered in relation to each of the other 3 categories.

Identity is inextricably intertwined with sociability: there could be no sense of self without a sense of the other. This is an important theoretical point but it also has practical implications. As we have seen in section 3.1, identity, considered alone, suggests questions such as – what does this phone say about me. This is a fairly typical question in design. But when it is explored in relation to sociability, the questions becomes more complex: what does this phone say about me and who

does it say it to? Post modernity speaks not of identity but identities; we are different people depending on where we are and who we’re talking to; the person in the office at three o’ clock in the afternoon may be radically different to the person in the night club at three o’clock in the morning. The identity that we want to present to colleagues may be quite different to the identity we want to present to strangers in a social setting. In the conceptual design example of the phone which could perform as a virtual personal ad in a bar the user may want to present quite different sets of information to different people; perhaps, for example, the user might like to pretend to have read rather more Tolstoy than they actually have in order to impress someone whose favourite book is Anna Karenina.

Identity in relation to security in this context yields different insights: it may be that the user in this bar is in fact married and eager to conceal this use of the phone from their partner. Identity and security are more usually thought of in terms of data protection and identity theft; but a relational approach suggests that there may be some types of data that one wishes to conceal from our nearest and dearest as well as criminals. The importance of this kind of security can be seen in the divorce courts. A relational consideration of identity and organisation uncovers concerns not immediately apparent from one perspective. The design example of two phones communicating to find a time for a meeting that would be mutually convenient to their owners does not consider the possibility that one of them does not want to have a meeting at all and would much rather pretend to be very, very busy for the foreseeable future whether they are or not.

By viewing identity in relation to other categories we have explored more nuanced design ideas. Likewise each of the other categories could be viewed relationally to generate new sets of problems and potential design challenges. Organisation in relation to identity for example would highlight the different organizational requirements of a busy mother to those of a businessman. A relational approach to experience then not only builds on rigorous theoretical accounts, it provides a tool for making research findings relevant to design.

5 DISCUSSION

This paper has drawn on a number of theoretical accounts of user experience in order to suggest research techniques that can be used to generate the kind of rich data necessary to explore user experience. For example McCarthy and Wright [14] have argued that data collection requires a first person perspective since an individual’s experience is in part concerned with what

the individual themselves bring to it. There is an emphasis in the literature [14, 6, 5] on the individual being continually engaged in experience and the important ways expectation shapes the meaning of experiences as they unfold. There are also concerns with the ways in which reflection and recounting influences, whether individuals appropriate a particular technology. With these kind of concerns in mind we adopted a case study approach to data collection since it offers the opportunity to study in depth how individuals make sense of their experiences. Consistent with the theoretical emphasis on the in-depth study of individuals, we chose three participants for our study who matched the demographics of the personae and who agreed that the personae resembled them. Yet our analysis revealed that none of the three subjects really felt that the Smartphone fitted in with their lifestyle or their image of themselves. We used anticipation interviews to understand what expectations our users had of mobile phones in general and their image of the Smartphone in particular, and these data suggest that there may be a large gap between the expectations generated by marketing and the actual experiences in practice of representative users.

Although sensitised towards existing theories and frameworks the study was firmly grounded in data. The grounded theory analysis of the data generated four experiential categories: identity, sociability, organization and security within the super ordinate category of relevance. A relational consideration of the four experiential categories generated a number of questions for design. Although the design concepts suggested are not developed, they provide some illustration of how the sometimes abstract and difficult theories of user experience relate to design.

While there is clearly more work to be done the methods described in this paper have illustrated the potential for developing a systematic and critical approach to experience evaluation.

REFERENCES

1. Battarbee, K. (2003). Defining Co-Experience, In *DPPI Conference Proceedings*.
2. Bjork, S. (2001). Activity-Based Mobile Interfaces: Toward a User Model for Hybrids Between Mobile Phones and PDAs. Conference of Human Factors in Computing Systems (CHI) Workshop: Mobile Communications: Understanding Users, Adoption & Design.
3. Blythe M, Monk A & Park J: Tele-Biographies: Data Collection Techniques for Capturing the ways that People Interact with Digital Technology CHI 2004
4. Cooper, A. (1999) *The Inmates are Running the Asylum: Why High Tech Products Drive Us Crazy and How to Restore the Sanity*. Indianapolis: SAMS McMillan.
5. Davis M. Theoretical Foundations for Experiential Systems Design. ETP 03 2003 Berkeley, USA. Copyright 2003 ACM 45-52
6. Forlizzi, J. & Ford, S. (2000) The Building Blocks of Experience: An Early Framework for Interaction Designers. In *Proceedings of the DIS 2000 seminar. Communications of the ACM*, pp. 419– 423.
7. Gaver, B., Dunne, T. & Pacenti, E. (1999): Cultural Probes, *interactions*, 6(1), pp. 21-29.
8. Harper, D. (2001). The Mobile Interface: Old Technologies and New Arguments. In Brown, B., Green, N. & Harper, R. (Eds.) *Wireless World*. London: Springer.
9. Helyar, V. (2001). Usability of Portable Devices: The Case of WAP. In Brown, B., Green, N. & Harper, R. (Eds.) *Wireless World*. London: Springer.
10. Hassenzahl, M. (2003). The Thing and I: Understanding the Relationship Between User and Product. In Blythe, M. A., Overbeeke, K., Monk, A. F., & Wright, P. C. (Eds.) *Funology: From Usability to Enjoyment*. Dordrecht, The Netherlands: Kluwer Academic Publishers.
11. Hull, R. and Reid, J. (2003) Designing engaging experiences with children and artists. In Blythe, M. Monk., A., Overbeeke, C., and Wright P., *Funology: From usability to user enjoyment*. Kluwer.
12. Jordan, P., 2000, *Designing Pleasurable Products: An Introduction to the New Human Factors*. (London: Taylor and Francis).
13. Ketola, P. & Roykkee, M. (2001). Three Facets of Usability in Mobile Handsets. *CHI 2001 Workshop: Mobile Communications: Understanding Users, Adoption & Design*.
14. McCathy J & Wright P 2004 *Technology As Experience* (MIT Press, Massachusetts).
15. Monk, A.F., Carroll, J., Parker, S., Blythe, M. (2004) Why are mobile phones annoying? *Behaviour and Information Technology*, 23, 33-42.
16. Norman, D.A. (2004). *Emotional Design: Why We Love (or Hate) Everyday Things*. New York: Basic Books.
17. Palen, L. & Salzman, M. (2002). Voice-Mail Diary Studies for Naturalistic Data Capture under Mobile Conditions. In *Proceedings of the 2002 ACM Conference on Computer Supported Cooperative Work (CSCW '02)*, New Orleans, Louisiana, pp.87-95.
18. Strauss, A. & Corbin, J. (1990). *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*. Newbury Park, CA: Sage Publications.
19. Taylor, A. S., & Harper, R. (2002). *Age-old Practices in the 'New World': A Study of Gift-Giving between Teenage Mobile Phone Users*. CHI 2002, Minneapolis, MN, USA, pp.439-446.
20. Ziefle, M. (2003). The influence of user expertise and phone complexity on performance, ease of use and learnability of different mobile phones. *Behaviour and Information Technology*, 21(5), pp.303-311.