A FIELD STUDY OF PERCEPTIONS AND USE OF MOBILE TELEPHONES BY 16 TO 22 YEAR OLDS

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ABSTRACT

   What do young people want from mobile technologies? How do they use mobile technologies in their everyday lives? This work uses multiple research methods to build understanding of 16 to 22 year olds' perceptions and use of mobile telephones. We propose a model of technology appropriation that represents the way they evaluate and integrate mobile telephones into their lives. The paper contributes to both information systems (IS) theory and practice. For IS researchers, this paper presents a picture of lifestyle rather than task-oriented technology use in diverse—and principally non-organisational—contexts. The multi-method research approach is in and of itself a contribution in enabling IS

researchers to construct a rich and sound understanding of mobile technology use in different contexts. The paper contributes to IS design, marketing and training practice by describing the influences on 16 to 22 year olds' appropriation of mobile telephones.

INTRODUCTION

Mobile technologies, particularly mobile (cellular) telephones and text messaging, have been widely adopted of young people and integrated into their everyday lives. To date there have been few descriptions of the ways that young people are adopting and using mobile telephones and there is little understanding of the reasons for high levels of use. This paper reports on a joint collaborative research project between Novell Pty. Ltd. and the University of Melbourne called 'Customers of the Future'. The project examines the use of mobile telephones in the everyday lives by young people aged between 16 and 22. The paper describes and helps understand the process of 'technology appropriation' through which the participants evaluate, adopt and shape mobile telephones to their needs.

THE RESEARCH APPROACH

We are investigating young people's perceptions of mobile technologies and how they are used in their social, leisure, work and educational worlds:

- What do they want from mobile technologies?

- How do they use mobile technologies?

Our interest in future needs and desires for technology influenced our selection of the research cohort (16 to 22 year olds) and context (large cities in a developed country). We studied the 16 to 22 year cohort as these are the 'customers of the future', moving from childhood into independent life in the adult world. The context is the two largest cities in Australia which is considered an early adopter of mobile technology. Urban young Australians are enthusiastic users of mobile telephones and Short Messaging Service (SMS, also called text messaging). Currently, use of mobile technologies in developed countries varies greatly:

- In Japan ownership of mobile technologies is high and iMode, the

CONTRIBUTION

This paper contributes to IS theory and practice by respectively providing increased understanding of the process of technology appropriation and by indicating ways in which technology designers can facilitate and support such appropriation more effectively. By detailing the initial, medium and longer-term influences on 16 to 22 year olds' adoption and use of mobile telephones, deeper understanding of the process by which this particular group of users appropriate mobile telephones is gained. These lay the foundation for further research into the influences on the appropriation of other technologies by different groups of users.

The research approach makes a significant contribution to IS research. By their very nature, mobile telephones involve human-technology interaction in diverse and dispersed contexts that are often poorly understood and difficult to access. We have used a novel but effective combination of research methods to derive valid and useful data about the role of mobile telephones in the participants' lives.

The research has implications for IS practice. The design process for long term and persistent use of a technology should be mindful of appropriation. Understanding how and why particular cohorts of users appropriate a technology should enable designers to design in flexibility as well as tailor marketing and training to assist appropriation. Deeper understanding of the reciprocal relationship between design and use will encourage more careful evaluation of the implications of designs and possible changes in use, thus improving the design process.

dominant service, is particularly popular with young people (Barnes 2001). However, the mobile technology context is unique due to a combination of economic, political and social factors (Barnes 2001; ICL 2000).

- In the US mobile telephone ownership is quite high but intense competition between telecommunication companies has prevented the provision of a common communication platform that would allow users to SMS subscribers of other companies

- In the rest of the developed world, including Australia, Scandinavia, the UK, and other parts of Europe and Asia ownership is rather high. About 65% of Australians own a mobile telephone, similar figures to the UK but somewhat less than Scandinavia, Italy and Hong Kong (Barnes 2001; Gooch 2002). Countries with a high use of SMS include all Scandinavian countries as well as the UK, Italy, Germany, Spain, Holland, Belgium, Australia and the Philippines. All of these countries have an integrated wireless medium and mobile telephones and SMS has been adopted by youngsters with great passion (see Carroll et al. 2001 in Australia; Ling and Yttri 1999 in Norway; Taylor and Harper 2001 in the UK).

RESEARCH METHODS

Traditional IS research approaches that focus on studying work practices in organisational settings (for example, Currie and Galliers 1999) were found wanting when applied to our cohort of interest (16 to 22 year olds rather than adult employees), our technology focus (mobile telephones rather than organisational information systems) and our activity set (work, leisure, social and educational activities rather than merely work). Therefore we combined several complementary research methods (Carroll et al. 2002), including focus groups, questionnaires, observations, on-line diaries and scrapbooks, to triangulate the 16 to 22 year olds' perceptions, recollections and actions. The research participants were

recruited by professional recruiting companies on the basis of access to a mobile telephone and the Internet as well as possession of their own email address.

Questionnaires

Before taking part in the first set of focus groups, the participants completed a questionnaire covering demographic information, access to and use of mobile telephones, method of paying for mobile telephones, use of SMS and a description of their favourite piece of technology.

First set of focus groups

The first set of focus groups consisted of four groups held in Australia's two major cities, Melbourne and Sydney (having populations of 3.5 and 4 million people respectively). Each focus group was run by a member of the research team with ample moderating experience. A total of 34 participants were distributed as follows: eight participants of mixed gender aged 16 to 18 and ten aged 19 to 22 in Melbourne; eight males aged 16 to 22 and eight females aged 16 to 22 in Sydney. Issues discussed in the focus groups ranged from current use of mobile telephones, learning to use them and maintaining up-to-date knowledge of them to participants' perceptions of mobile telephones. The focus groups provided access to participants' recollections of their use of mobile telephones and their interpretations of mobile telephone use by individuals and groups.

Participant observation

Focus groups are especially valuable for learning about participants' experiences and perspectives and for producing insights (Leifer, Lee and Dirgee 1994). However, the social settings of focus groups are unnatural. In contrast, participant observation allows in-depth observation of natural settings over time but it may be difficult to access the topic of interest due to intermittent or difficult-to-observe phenomena (Morgan 1997). We combined focus groups and participant observation, thus providing naturalness of observations in context as well as a concentrated set of interactions.

After establishing rapport between the researchers and the participants, six participants of the first set of focus groups were selected for observation in their everyday activities. Slices of the participants' days were observed at leisure, in social activities and in educational contexts at different times during the week, weekend and holidays (school or university, depending on the participant's age). The researcher participated as an outsider in the participants' activities, asking questions to clarify their actions and motives (see also Goguen 1994). Outcomes were the researcher's observations and interpretations of the role and use of mobile telephones in the lives of the participants.

On-line diary

All participants completed an online diary of their use of mobile telephones for two days a week for three weeks (selection of days was randomised). The diaries provide a post hoc record of participants' use of mobile telephones including the time of day, place (e.g. bedroom), item (e.g. SMS) and a description of the task (e.g. contact a friend about a meeting time). Diaries were used to complement the observations as participants' uses of mobile telephones were irregular and often occurred at times where observation was not feasible. Diaries also provided data where communication problems between the researchers and participants may occur due to differences in age and culture (de Laine 1997).

Scrapbooks

Participants were provided with an empty scrapbook and a disposable camera with built-in flash (the cost of developing the film was reimbursed to the participants). They were asked to use the scrapbook to 'paint a picture in your own words and visual associations of mobile technologies, what they mean to you and how they relate to your everyday life'. Contents of the scrapbooks included pictures cut from magazines and newspapers, stories, poems and anecdotes as well as photographs. The aim of the scrapbooks was to provide an alternative way to access the participants' perceptions of mobile telephones and their understanding of the role of mobile telephones in their lives and in modern society.

Second set of focus groups

After nine weeks, the participants attended a second round of focus groups. They returned their scrapbooks and explained the contents to the researchers and the rest of their group. The diaries and observations, along with the findings from the first focus round and the scrapbooks, were used as inputs to trigger discussion in the second focus round.

These research methods were selected to provide different views of the perceptions and use of mobile telephones. The first focus round gave an initial overall picture of the participants' perceptions and use of mobile telephones. Individual perceptions of mobile telephones were presented in the scrapbooks and examined further in the discussion at the second focus round. Use of mobile telephones was studied in greater depth in the online diary and participant observation. Therefore, this combination of research methods provided access to group (focus groups) and individual (questionnaire, scrap book, online diary and observation) views as well as participants' recollections of actions (focus groups, questionnaire, scrap book, online diary) and researchers' interpretations of the participants' actions in their everyday contexts (observations). There was a high level of agreement in the data from the different sources. However, observing the participants in their everyday contexts provided much deeper understanding of their use of mobile telephones and the drivers of this use compared with the other research methods.

FINDINGS

Since we observed that the participants have appropriated the technology to suit their particular needs (see also Ling and Yttri 1999), we propose a model of technology appropriation, as shown in Figure 1. In the model, a technology (mobile telephone) as envisaged by its designer (technology-as-designed) is transformed into technology as currently used (technology-in-use) following evaluation at three levels, reflecting degrees of familiarity with the technology at different times. There are three possible outcomes to this evaluation: non-appropriation, disappropriation and appropriation.
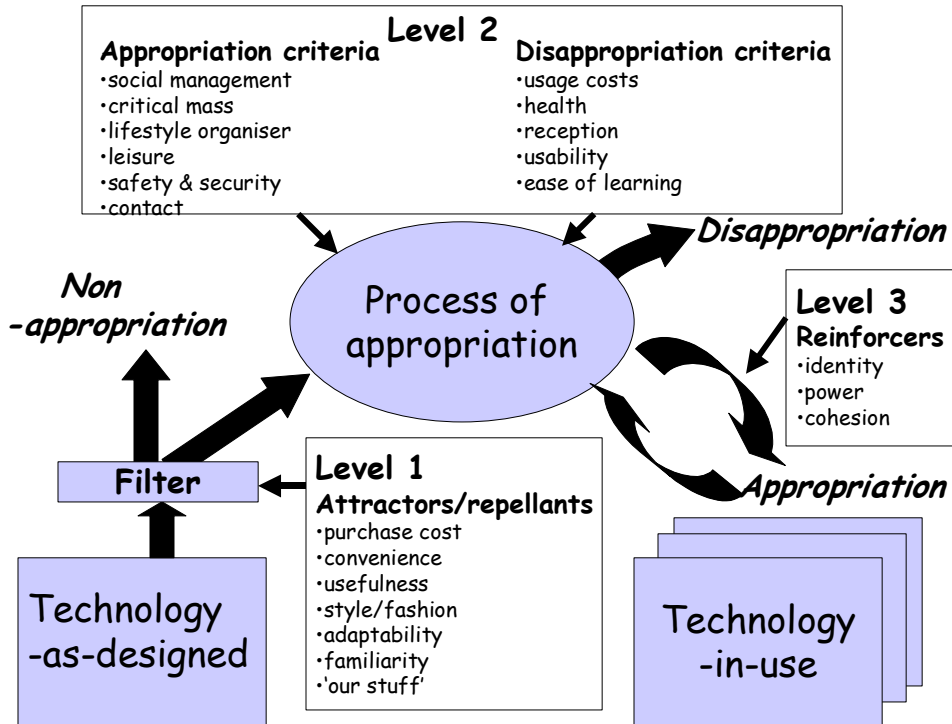
Figure 1 Appropriation of Mobile Telephones Model

Level 1 relates to the filtering that occurs when a technology is first encountered, such as in a shop or when a friend shows a new piece of technology. Initial perceptions are thus made without any prolonged use of the technology. The outcomes of this filtering are non-appropriation, where the participants are uninterested in the technology, or otherwise initiation of the process of appropriation. To date, most IS research has focused on this initial acquaintance with a technology (Tyre and Orlikowski 1994) and the decision to adopt a technology, including Diffusion of Innovation (Rogers 1995) and the Technology Acceptance Model (Davis 1989). However, the decision to adopt a technology is followed by a whole process of deeper evaluation (Levels 2 and 3 hereinafter) that may, or may not, result in ongoing use.

Level 2 reflects a deeper evaluation through use. If the participants are attracted by a technology, they will explore it in depth. They will play with it and use it in different contexts to undertake a range of activities, either alone or in a group. There are two

possible outcomes. Appropriation occurs where the participants try and evaluate the technology, select and adapt some attributes and take possession of its capabilities in order to satisfy their needs. Disappropriation occurs when, at some stage during the appropriation process, participants choose not to persist with the technology.

Level 3 captures the longer-term ongoing use of a technology. The technology is appropriated and integrated into participants' everyday routines. Appropriation is not a one-off activity but rather is subject to ongoing reinforcement. Changes in participants' needs or introduction of a technology that satisfies their needs more completely may lead to disappropriation of the technology; thus there is a recursive relationship between the process of appropriation and a technology-in-use that may result in a previously appropriated technology being disappropriated. In our research, there was evidence that many participants are disappropriating home

telephones and replacing them with mobile telephones.

We observed that different influences operate at the three levels. We have called the initial filtering influences at Level 1 *attractors* that encourage users to further explore the technology in the process of appropriation and *repellants* that may dissuade users from deeper evaluation, resulting in non-appropriation of the technology. During the process of appropriation at Level 2 we have identified *criteria* that encourage continuing evaluation of the technology. These criteria influence the decision to either appropriate or disappropriate the technology. Finally, at Level 3 we have identified a set of *reinforcers* of persistent use. These influences come into play at various times in the process of technology appropriation. We noted that the participants typically move from an initial acquaintance with a mobile telephone—guided by attractors and repellants—through an in-depth evaluation, on the basis of appropriation and disappropriation criteria, to ongoing use supported by higher order reinforcers, as they learn more about the technology and its relationship to their needs and wants.

The influences at each level are described in the following discussion. Examples and quotations from the questionnaires, focus groups, scrapbooks and observation are provided to illustrate these influences.

Attractors and repellants

The influences noted by the participants at their initial acquaintance with a new mobile telephone include cost, convenience, perceived usefulness, fashion or style, ability to adapt or tailor the technology, familiarity and perceptions of whether it is technology for their age group.

At this early stage, participants evaluate whether they can afford to purchase the technology or not; if not, the technology may be rejected immediately.

The most commonly mentioned attractor for mobile telephones is convenience. One male described his mobile telephone as "*my life, I would be lost without it. It is very convenient and useful.*" The freedom from

constraints of time and place provided by mobile telephones was noted by many of the participants: "*I like to be able to speak to anyone else at any particular time I choose to.*" Perhaps mobile telephones are rendering the social world of a young person 'available' in the same way the philosopher Heidegger describes successful interaction with technology as having the property of 'readiness-to-hand' (Heidegger 1962). Mobile telephones are both convenient in and of themselves, and they aid in making the social world of the youngsters convenient also.

There was a range of attitudes about the importance of style or fashion with mobile telephones. Style was nominated in the second round of focus groups as one of the most important influences on initial mobile telephone use. Most participants were interested in the style of a telephone but would not replace an existing telephone purely because of its style. However, as one participant noted, "*If you're going to spend the money, you want something that looks good.*" A related influence is the ability to personalise a mobile telephone to the individual's tastes, for example through ring tones and coloured telephone covers.

Some of the burden of this filtering process is removed for technologies that are refinements to existing, well-known technologies. For example, text messaging was an incremental addition to familiar technologies and did not require frame-breaking changes in the way users interacted with their mobile telephones (see Ling and Yttri 1999). As a result, it was easy to learn, critical mass was quickly achieved and so it was rapidly and seamlessly integrated into their lives. Contrast this to a frame-breaking innovation that must be viewed and evaluated from scratch, such as the introduction of e-mail.

Further, technologies are divided across generations. One participant described mobile telephones, SMS, chat and email as "*our stuff*" and contrasted it with conventional technologies such as televisions, video recorders and the content of information technology subjects taught at school. We have labeled this division 'our stuff/their stuff.' If it was 'our stuff' it was more likely to be

positively evaluated and appropriated. Mobile telephones are seamlessly woven into their lives, almost invisible and mundane in their ordinariness. They only become conspicuous, or 'unreadiness-to-hand' in Heidegger's terminology (Heidegger 1962), when faced with someone who cannot master the technology–for example older people such as parents and teachers–or people who do not own the technology–especially friends who are struggling to remain in their social groups. The participants noted that many older people struggle to master mobile telephones: "*Mobiles have got too many complicated things for them to learn... They get really frustrated, there's so many ways to do the one thing.*" In contrast, the participants have used mobile telephones since they were little and they learn more easily: "*We are not scared to make mistakes.*"

These attractors act as a coarse-grained filter for the participants: mobile telephones will enter the process of appropriation if they satisfy these attractors that enable them to view an unknown technology and assess whether to experiment with it or not. If not, then the technology is rejected and non-appropriation occurs.

We expect that the attractors are symmetrical, each attractor being associated with an equivalent repellent. However, our research only provides data about a few of these: cost, where the mobile technology is not affordable; and 'their stuff', where the technology is seen as belonging to an older generation. This absence of observed repellants may be a methodological artifact due to our biased cohort (all the participants had access to a mobile telephone and so by definition the attractors had already 'won out' during their earlier experience of the technology), the inability of participants to voice such issues, or it may be an error in our model's assumption about the bi-polar nature of attractors.

Appropriation criteria

The second set of influences comes into play as part of the process of appropriation. Users are attracted to a technology, experiment with it and evaluate whether it adds value to their lives. If the technology resonates with their needs or provides 'fit' with their lives then it will be appropriated. Appropriation criteria that influence whether a mobile technology will be appropriated are discussed below.

Mobile telephones and especially text messaging are essential for social lives. Many participants used them to maintain contact with friends and to arrange social events. A university student was observed sending a text message while walking between lectures; she checked her mobile telephone for messages after each lecture. A schoolboy observed arranging a meeting of friends described mobile telephones as "*a pre-requisite for a social life.*" He has two friends without telephones and finds it difficult to include them in his social plans.

This suggests a further characteristic of appropriation criteria that applies to social devices: a mobile technology may need to achieve critical mass in a social group before it can be considered to be appropriated. Playing with a technology and evaluating its usefulness may be an individual activity but the final position taken on the technology may be greatly influenced by group preferences (see Grudin 1994).

Mobile telephones are important as lifestyle organisers: many of the participants stored important numbers in the mobile telephone, such as friends' telephones, bank accounts and tax file details as well as important appointments and birthdays.

Mobile telephones are also used for leisure and fun activities, sometimes as individuals but often in groups. Group activities observed included use of SMS in school classrooms and messaging between students in a university lecture. Several male participants used their mobile telephones when they were bored, travelling on a train or waiting for friends. An 'Ode to my mobile phone' was written in a girl's scrapbook: "*Oh mobile phone, I am all alone, Where are you?*"

Safety or security was often the catalyst for purchasing a mobile telephone. Many parents bought mobile telephones for their teenagers so they could maintain contact and supervise their activities. Mobile telephones

provide a sense of security for the participants as they can call for help in an emergency: "*mobiles are a necessity, not just for kids but for everyone...24X7 access... It is important to have that security*."

Mobile telephones facilitated contact with the range of people with which many of the participants interact. They allow employers to ring at the last minute to arrange for shifts to be covered; when the young people are running late for work, they can call the employer to let them know. For participants too young to drive a car (under 18 in Australia), mobile telephones enable transport arrangements to be made late at night; one scrapbook entry showed a group of young males using their mobile telephones to ask their parents to collect them after a party.

Disappropriation criteria

The participants had a number of negative perceptions of mobile telephones. We argue that if none or few of the appropriation criteria are satisfied or if the negative perceptions of a technology become ascendant, then the technology will be discarded or disappropriated, possibly for another, more closely-fitting technology.

The most common negative aspect of mobile telephones discussed by the participants was the cost of using mobile telephones. A number of participants experienced problems paying their mobile telephone bills. Many school-aged participants use pre-paid telephones. Other participants complained about poorly explained mobile telephone plans and difficulty in keeping track of call costs. A working male aged twenty-one says, "*I use it too much - every day and every night. After a month the cost is scary*."

The possible relationship between mobile telephone use and brain cancer was raised in each focus group. However, this was not sufficient to affect telephone use. A female university student described how she thought about the health implications of her use of a mobile telephone every day. When asked whether these concerns affected her use of the mobile telephone, she said "*Yeh… It tries, but I can't, I just talk too much. I should get off because I keep thinking that my ear's getting warm but then, my conversation is too important*."

Poor reception for mobile telephones was mentioned by a number of participants and differences between different local carriers were observed; however, this appeared to be accepted as a characteristic of mobile telephone use.

Although some features of mobile telephones were perceived as difficult to use or learn, they did not appear to impede their adoption. There were complaints about the size of the keys on mobile telephones but there was general agreement that the participants adapted quickly to text messaging. Basic work on the user interface (for example Goldstein et al. 1998) is likely to help but it appears that such design work may not be necessary to facilitate the appropriation of new mobile technologies.

Many of the participants had to teach parents (and grandparents) how to use mobile telephones but learned from friends or from school and as such a view of learning that is embedded in social contexts is likely to provide more leverage (see, for example, Smith et al. 1989). The participants suggested that it was more reliable to trust friends rather than commercial sources because friends know the kinds of attributes that young people are looking for and how the technology will be used.

However, these negative perceptions do not appear to affect participants' use of mobile telephones: they are not sufficient to overcome the convenience provided by the technology. When faced with a choice between convenience and dealing with the problems of technology, convenience wins out: "*You get used to the problems of technology - you work around them*."

Reinforcers

Three major influences that relate to the participants' continued use of mobile telephones were noted in the research. They enable the young people to establish an identity or sense of belonging, to negotiate and exercise power and to achieve cohesion by dealing with the fragmentation of their lives. Once a technology is appropriated and integrated into participants' lives, its ongoing

use is reinforced through reference to these higher-order influences.

Mobile telephones helped the participants build a strong sense of belonging and identity. SMS is a powerful means for the young people to establish and reinforce individual and group identity. A common comment made by the participants in this research after checking for SMS messages and finding none is "*No one loves me*". Mobile phones reinforce a sense of identity because "*it is you being called not your home.*" Selection of a mobile telephone carrier is frequently determined by the social group: participants select the carrier that their friends use so that they can enjoy free chat or SMS at certain times of the day. This creates a sense of belonging to a group that is reinforced over time as friends call and send text messages. Without mobile telephones, it is a struggle to maintain social links: one must rely on public telephones when the social group is arranging ad hoc meetings. A young male described the difficulties faced when trying to include friends without mobile telephones into his group's social plans: "*by the time the friends arrive at an agreed meeting place, the group has moved on to another venue.*"

The second influence is power. The participants used mobile telephones to help them navigate the different sources of power in their lives as well as exercise power over them. Mobile telephone features such as profiles (personalised ring tones for different callers), caller ID and voice mail are used to filter calls so that the young people can choose which telephone calls that they will answer (see also Brown and Perry 2000): "*I don't have to speak to the person if I don't want to.*" SMS or text messaging is also used to avoid arguments when negotiating social activities with friends. One person can broadcast a message to the rest of the group; the absence of two-way dialogue reduces the chances of disagreement. Access to mobile telephones provides a way of dealing with parental or educational authority: one school girl described how she calls friends from her bedroom on her mobile telephone while her parents believe that she is doing homework. SMS is used in classrooms to communicate without teachers' knowledge: "*If*

you're bored in class then you SMS across the room: 'I'm really bored.'"

Thirdly, mobile telephones enabled participants to deal with the fragmentation of their lives. Fragmentation may arise from geographical distance as well as distinct work, educational, social and personal groups. Many of the participants spoke of the many different groups of people in their lives. A highly mobile population, blended families and the popularity of overseas study have resulted in geographically dispersed contacts. Mobile telephones help develop and maintain virtual communities of family, friends and other young people with similar interests.

As long as mobile telephones fit with the needs and lives of the participants, their use will be reinforced and stabilised; they become a mundane part of their everyday lives. At the same time, they shape the participants' needs and lives, offering new ways of living and interacting in the world, such as facilitating an ad hoc approach to life (see Carroll et al. 2001). We suggest that, as long as a technology satisfies the higher-order needs, its use will be reinforced. When these needs are no longer satisfied or a new technology becomes available that satisfies these needs more completely, then mobile telephones may be disappropriated and their use abandoned.

CONCLUSION

This paper describes perceptions and use of mobile telephones by 16 to 22 year olds and extends our understanding of technology appropriation. These findings have two major implications for IS developers. In addition, the research approach is valuable for IS researchers who are examining technology use in diverse personal and social contexts.

We asked with regard to 16 to 22 year olds: 'What do they want from mobile technologies?' and 'How do they use mobile technologies?' The wants of the 16 to 22 year olds examined in this research are evident from the influences that attract them to mobile telephones such as affordable cost, convenience, perceived usefulness, appealing style and identification with their age or social group (described as 'our stuff'). Familiarity

with the type of technology increases the ease with which they evaluate a new technology. The participants use mobile telephones to add value to their lifestyles, satisfy their social and leisure needs and reinforce their group identity. It was clear in this research that the participants make lifestyle rather than task-driven decisions. We observed that ongoing use of mobile telephones is driven by the need to deal with such issues as identity, power and fragmentation.

Although this research was undertaken in two large cities in Australia, we argue that there are similar trends in use of mobile technologies in countries with high mobile telephone ownership and high rates of SMS use. Indeed, our results are supported by research findings in Scandinavia and the UK (Ling and Yttri 1999; Taylor and Harper 2001).

This paper examines the participants' wants from, and uses of, mobile telephones from the perspective of the appropriation of technology. Appropriation has been defined as "taking possession of" (Oxford 1987). Although the concept of technology appropriation has been discussed in the IS literature (for example, De Sanctis and Poole 1994, Orlikowski 1992 and 2000; Tyre and Orlikowski 1994), there has been little detailed analysis of the way that specific technologies are appropriated over time. This paper opens up the concept of appropriation and presents a model of technology appropriation that represents the way that 16 to 22 year olds have taken possession of mobile telephones, as shown in Figure 1. It describes the process of technology appropriation as the way that users evaluate and adopt, adapt and integrate a technology into their everyday lives.

The findings have two major implications for IS developers. Firstly, designers need to consider more than the user's very initial (Level 1) experiences of a technology. The typical short and targeted tests conducted during the development of technology are unlikely to uncover the longer-term experiences (operating at Levels 2 and 3) that seem so central to the appropriation outcome. Where possible, designers should gain some insight from the influences on successful appropriation of a technology by a particular user cohort. Secondly, since mobile telephones were observed to be important in supporting personal needs (sense of identity and belonging, power and cohesion) and complex social, lifestyle and leisure arrangements, the contents of the typical requirements specification may be inadequate when dealing with technologies that are employed in contexts that are not purely organisational. Requirements specifications need to be expanded from a focus on function and task to incorporate lifestyle, leisure, personal and social needs. This implies the need to study the personal and social as well as physical and organisational contexts in which a new technology will be placed.

It is clear that there are significant challenges for practitioners who wish to design for appropriation and longer-term persistent use of a new technology. Developers of social technologies in particular, more than developers of any other form of technology, must rely on a 'developed sensibility to the situation of use'. Interestingly, these issues have been realised by the CSCW community for some time (Grudin 1989) and are an area for future research to build on the findings presented in this paper. We are currently engaged in a scenario based design process exploring the implications that these influences have for innovative mobile appliances (Howard et al. 2002a; 2002b).

Finally, the research approach described in this paper makes a valuable contribution to IS research. The trends towards mobility and technology convergence are blurring the distinctions between our work, social and leisure activities. Investigating these activities as users move through diverse and dispersed contexts requires that we augment traditional IS research approaches; this research illustrates one possible alternative. There has been much discussion of the need for qualitative researchers to triangulate through use of multiple methods (Barley 1990). In this research, a combination of methods providing individual and group perceptions, participants' recollections and researchers' observations is used to construct a rich description of 16 to 22 year olds' appropriation of mobile telephones. One advantage of combining different research

methods is that we have both *described* participants' perceptions and uses of mobile telephones as well as *explained* the drivers for very high levels of use of mobile telephones among young urban people in developed countries.

A limitation of the research is that it is a study of urban 16 to 22 year old early adopters of mobile telephones from a country (Australia) that has enthusiastically adopted mobile telephones. Intensive research such as ours aims to develop deep understanding of a phenomenon; further studies of young urban people in other countries with similar adoption profiles could be used to confirm or extend our findings. Also, this research examines participants who use mobile telephones; further research into the perceptions and choices of non-adopters (those who do not use mobile telephones) would be valuable to strengthen our understanding of the influences on non-appropriation and disappropriation. Given these limitations, this research has laid a foundation for further investigations of technology appropriation, especially extending the model to different technologies and to different user and non-user cohorts in different countries.

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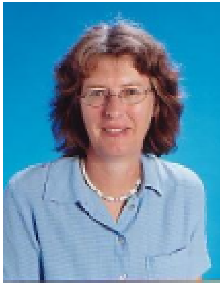
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