Just what do the youth of today want? Technology appropriation by young people

Jennie Carroll, Steve Howard, Frank Vetere
Department of Information Systems,
University of Melbourne, Parkville 3052.
Tel: +61 3 8344 9237
<initial.lastname>@unimelb.edu.au

Jane Peck, John Murphy
Cambridge Technology Partners,
Richmond 3121
Tel: +61 3 9224 2000
<firstname.lastname>@ctp.com

Abstract

What do young people want from information and communication technology? Why do they adopt some technologies but reject others? What roles do mobile technologies play in their lives as they move from childhood toward the adult world? Working from a social constructionist perspective, and on the basis of an extensive empirical research process, we are gaining insight into the variables heeded by young people during the earliest stages of technology use, stages we call 'appropriation'. We propose a model that discusses appropriation in terms of the interplay between what young people desire, the capabilities and implications of technology and the situations of use that young people inhabit. Depending on the balance between these factors we are able to observe three outcomes: non-appropriation, appropriation and disappropriation. Conceptually we are describing technology use as a process of 'personal construction', quite different to the 'construction' processes followed by the designer, but nevertheless equally important.

1. Introduction

Mobile technologies, particularly mobile phones and text messaging, have been widely adopted by young people and integrated into their everyday lives. To date there has been little description of the ways that young people are adopting and using mobile technologies and so we have little understanding of the reasons for high levels of use, or the opportunities for designing new technologies that will further support young people's lifestyles. This paper reports on a research project that examines young people's adoption of information and communication technologies (ICTs) in order to envision the design of innovative technologies. It focuses on the use of mobile technologies in the everyday lives of young people aged between 16 and 22.

In order to build understanding of young people's use of mobile technologies, information systems (IS) researchers need to move beyond organisational contexts. The current focus on studying work practices in organisational settings is found wanting when applied to our cohort of interest (young people, rather than adult employees), our technology focus (mobile devices, rather than organisational information systems) and our activity set (which is broader than work, including leisure, social and educational activities). By their very nature, mobile technologies involve human-technology interaction in diverse, and dispersed, contexts. The research context for this project is not the workplace or organisation but scattered spaces in which young people live and undertake leisure, work, education and social activities. These spaces are poorly understood, there is little existing domain knowledge and obtaining access to them is difficult. Deriving valid and useful data about the role of mobile technologies in young people's lives requires new combinations of research methods and concepts because existing theories, research approaches, factors and measures have largely been derived from studying the development and use of ICTs in organisations. Consequently, we have complemented established IS research methods with those derived from marketing, such as focus groups. The study reported in this paper examines young people's use of mobile technologies as well as their perceptions of and attitudes to mobile technologies. It describes some of the factors that attract young people to mobile technologies and builds theory about the process by which young people adopt and shape mobile technologies to their needs. The outcome is a rich model of the process of technology appropriation by young people.

In the next section the research approach for the project is described. Then the findings from the research are outlined, followed by the presentation of an extended

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model of technology appropriation by young people. The final section contains our conclusions and some indications of areas for further research.

2. The Research Approach

We are exploring the topic of young people's use of mobile technologies in the social, leisure, work and study worlds of urban young people in a developed country—in this case the two major Australian cities of Melbourne and Sydney. The research is exploratory: both the topic and its context are poorly understood and there are few established research approaches that have been used in IS research for this kind of research.

A methodological framework, structured-case [1], was used for the research. An initial conceptual framework expressed the territory to be explored in the study [2]. This provided the starting point for an iterative research process that involved planning, collecting and analysing data and reflecting on the implications of the data for the conceptual framework; the conceptual framework was then updated to incorporate the findings from the research. This process of iterative refinement of the conceptual model is ongoing at the time of publication. The initial conceptual framework places the specific areas of interest—the process of appropriating mobile technologies and the resulting range of uses—within the larger context of designing and supplying technology, adopting and using it and integrating it into everyday life. This larger context is called the technology appropriation model [3] and is shown in Figure 1. It expresses the transformation of technology as it is envisaged by its designer (technology-as-designed) into technology as currently used by young people (technology-in-use). The nature of this transformation is labeled the process of appropriation; this is the way in which technology or technological artefacts are adopted, shaped and then used by young people. Choosing not to discover the capabilities of the technology or failing to explore and evaluate the technology results in non-appropriation. Deciding to experiment with the technology initiates the process of appropriation that may result in either integration of the technology into everyday lives or disappropriation where the technology is rejected. Understanding the process of appropriation and the resulting technology-in-use acts as a foundation for designing new artefacts that will be appropriated by young people.

A combination of methods was used to build understanding of young people's use of mobile technologies [4]. Moving beyond the organisational context is unusual in IS research and so we drew on research methods from various other disciplines. Focus groups, questionnaires, participant observation, on-line diaries and scrapbooks were all used to collect data and triangulate young people's opinions and recollections. These have provided rich understanding of young people's perceptions of, and attitudes to, mobile technologies.

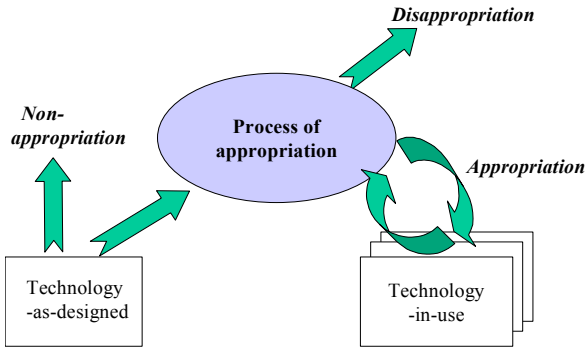

Figure 1 Technology Appropriation Model (Carroll et al. 2001)

2.1. Focus groups

At the start of the research project four focus groups were held, two each in Melbourne and Sydney. Participants were recruited on the basis of access to a mobile phone, regular Internet use, a personal email address and willingness to be observed undertaking everyday activities by a researcher. The two Melbourne focus groups involved eight young people of each gender aged 16 to 18 and ten aged 19 to 22 and the two Sydney focus groups involved eight males aged 16 to 22 and eight females aged 16 to 22. Thus we were able to explore both age and gender issues in appropriation. Issues discussed in the focus groups included current use of mobile technologies, how they learned to use them and how they updated their knowledge of them and their attitudes to, and perceptions of, these technologies. The focus groups provided access to participants' recollections of their own use of mobile technologies and their interpretations of use of mobile technologies by individuals and groups of young people. It also helped to establish rapport between the researcher and participants, some of whom were selected to be observed at a later time.

2.2. Questionnaires

At the first focus group, each participant completed a questionnaire covering demographic information, mobile phone access, mobile payment scheme, use of SMS, and

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a description of their favourite piece of technology.

2.3. Scrap books

Additional data were gathered through a less-conventional means. Participants were provided with an empty scrapbook and a disposable camera with built in flash. 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'. A minimum contribution was to develop the photographs and place them in the scrapbook with a caption explaining its place in the life of the participant. The aim of the scrapbooks was to provide an alternative way to access the participants' perceptions of, and attitudes to, mobile technologies and their understanding of the role of mobile technologies in their lives and in modern society. It also sensitised the participants to the role of technology in their lives. A female participant commented: "*you can't live without it, everything relies on technology. Doing the scrapbook made me realise how important technology is.*"

2.4. Participant observation

Focus groups collect data through group interaction on a small number of issues determined by the researcher [5]. 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 [5]. We chose to use both of these methods, thus providing naturalness of observations in context as well as a concentrated set of interactions. Focus groups provided rapid data collection to construct an overall view of the place of mobile technologies in participants' lives and established rapport with the young people. This was complemented by observation to add depth and detail of a few selected cases. Six participants were observed individually while undertaking a range of activities (leisure, social and educational) in different contexts. A researcher participated as an outsider in the activities, asking questions to clarify the participants' actions and motives (see also [6]). This provided understanding of what the participants do with technology rather than what they say they do (as in questionnaires and focus groups). Participant observation was vital for describing the influences on young people's appropriation of technology. It enabled the researchers to interpret the use and role of mobile technologies in the lives of the young people.

2.5. Online diaries

Finally, the participants completed an online diary of their use of mobile technologies for two days of the week for three weeks. The diaries provide a 'factual' record of participants' use of mobile technologies including the time, place and description of the use. Diaries were used to complement observation, as participants' use of mobile technologies was irregular and often occurred at times where observation was not feasible (such as outside of working hours). Diaries also provided data where communication gaps resulting from differences in the age and culture of the young people and the researcher may occur [7].

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

Together, these research methods provide access to group (focus groups) and individual (questionnaire, scrap book, online diary and observation) views as well as participants' post hoc recollections of actions (focus groups, questionnaire, scrap book, online diary) and researchers' interpretations of the participants' actions in their everyday contexts (participant observation).

3. Findings

Analysis of the data enabled us to identify the influences that initially attract young people to a technology and those criteria that encourage them to integrate a technology into their lives. We have noted three sets of factors that influence young people's adoption, shaping and use of mobile technologies and suggest that they come into play at various stages of the technology appropriation model, resulting in non-appropriation, disappropriation and appropriation. These sets of factors are shown in Figure 2 and examples and quotations from the questionnaires, focus groups, scrap books and observation are provided in the following discussion to illustrate these factors.

3.1. Attractors

Technology-as-designed offers functions that afford or constrain, that 'shape', the users' actions. It has been suggested that "*Individuals tend to expose themselves to ideas that are in accordance with their interests, needs, and existing attitudes*" [8: pp164]. In the questionnaire, the participants nominated their favourite technology: most (23 out of 34 participants) nominated their mobile

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phone (the computer (7) and stereo/CD/Walkman (4) were also favoured). It was observed that the young people tend to experiment with and evaluate a technology if it is convenient, affordable, supports their actual rather than hypothetical activities or satisfies their needs for style or fashion. The most powerful attractor for mobile technologies is convenience. One male described his mobile phone as "*my life, I would be lost without it. It is very convenient and useful*." Mobile phones satisfy "*Pure laziness. I ring from my bed rather than going to the home phone*." A young girl stated that "*I like to be able to speak to anyone else at any particular time I choose to."* An older male described his mobile phone as "*convenient, easy to use and versatile. Instantaneous form of communication anytime, anywhere."* The freedom from constraints of time and place provided by mobile technology was noted by many of the young people: "*you can use it any time*." Perhaps the devices are rendering the social world of the young person 'available' in the same way the philosopher Heidegger describes successful interaction with technology as having the property of 'readiness-to-hand' [9]. ICTs are both convenient in and of themselves, and they aid in making the social world of the young people convenient also.

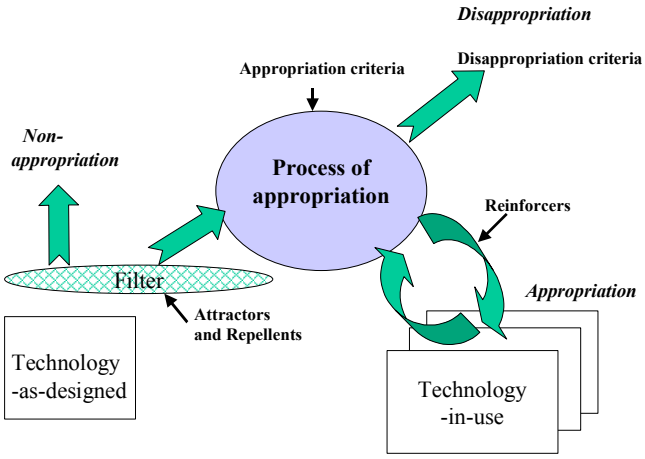

Figure 2 The Revised Conceptual Model

Another convenient aspect of mobile phones is the control provided over callers. Young people filter calls through using different ring tones or text messages for different callers: "*Mum calls when I'm out drinking. Let it go and SMS her*." and "*I don't have to speak to the person if I don't want to*."

Participants identified the need for technologies to support actual rather than hypothetical or possible future activities in their lives [10]: the young people will experiment with a technology if it was perceived that it may be useful in their everyday activities. These actual purposes of technology use are described in more detail under 'Appropriation criteria' in the following section.

There was a range of attitudes about the importance of style or fashion with mobile phones. Some participants suggested that fashion is more important to primary-aged children (below thirteen years). However, style and fashion was nominated in the second round of focus groups as one of the most important drivers of initial mobile phone use. Most participants were interested in the style of a phone but would not replace an existing phone purely because of its style. However, as one participant noted, "*If you're going to spend the money, you want something that looks good*." An exception was a sixteen year old boy who uses his mother's phone: "*it's old fashioned, big and heavy and inconvenient. It even has an aerial*." All his friends have more modern phones and he is very keen to have a new phone: "*I don't want to be seen with a crap phone*." Accessories were popular: "*You can personalise phones/cases/covers to your taste. One of the main things*." but not necessities: "*You don't really need them but they're very convenient*." Other participants are critical of fashion and fads favoured by "*Pretentious people who just try to look good*."

Some of the burden of this filtering process is removed for technologies that constitute only incremental changes to existing, well-known technologies. The familiarity of a technology appears to be one of the main filters for technology adoption: whether it represents a refinement of a technology that young people already use or whether it is a frame-breaking innovation that must be viewed and assessed from scratch. For example, SMS was an incremental addition to the functionality of mobile phones and did not require frame-breaking changes in the way young people interacted with their phones [see 11]. As a result, it was easy to learn and critical mass amongst young people was quickly achieved and so it was rapidly and seamlessly integrated into young people's lives.

Further, technologies are divided across the generations. One participant described young people's technologies such as mobile phones, 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 assessed and used. Participants' frustrations with conventional technology can be contrasted with the ease with which mobile technologies have been integrated into their lives. Observing one university student's struggle with a photocopier in a university library illustrated this: the machine had contradictory instructions and there was an absence of any human assistance. The student's increasing frustration with the

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unfamiliar and non-intuitive technology was clear; intervention from a classmate prevented her from leaving the library without completing her task. Such a view was supported by observations at a university lecture where an introduction to multimedia was based around overhead transparencies with no illustrations of multimedia on the Internet from the computer provided in the lecture theatre. Students were bored, discussed their private lives, sent SMS messages and paid no attention to the lecture. These examples vividly illustrate the frustrations or irrelevance of some conventional technologies to the young people observed. In contrast, mobile technologies 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, [9]) when faced with someone who cannot master the technology (older people such as parents and teachers) or people who do not own the technology (such as friends who are struggling to remain in their social groups).

One seventeen year old being observed noted that, in regard to new technologies, "*Old people just don't understand and can't keep up with the changes*." Parents are "*Scared of it. We've used it since we were little. Parents don't know what they're talking about*." Older people struggle to master mobile technologies; they have no frame of reference to operate from as they are radically different from previous technologies. A twenty-one year old male commented that "*Older people have phones [and mimes the circular dialing action - all participants laugh loudly]. 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*." A sixteen-year-old male added: "*They ask 'What do I do next?' As soon as they're alone with it, you just know that they're going to stuff up*." An older male commented: "*My Mum... I tell her how to do it about 60 times but she doesn't get it into her head... Technology today, it's out of hand*." Young people learn more easily: "*We are not scared to make mistakes*."

As Alan Kay noted in his keynote address to the 1990 World Conference on Computers and Education, technology is everything that comes along after you're born. Some 'older' technology is invisible to these youth and some is irrelevant or frustrating; 'their' technology is quite different and their ownership of it distinguishes them from people who are not like them (parents, teachers, employers and so on).

These attractors act as a coarse-grained filter for young people: technologies will be considered for adoption—or will enter the process of appropriation—if they satisfy these attractors. The attractors enable young people to view an unknown technology and assess whether to experiment with it or not. If not, then young people ignore the technology and non-appropriation occurs.

3.2. Appropriation criteria

The second set of factors comes into play as part of the process of appropriation. Young people are attracted to a technology, experiment with it and evaluate whether it adds value to their lifestyle. If the technology resonates with the needs of the young people or provides 'fit' with their lives then it will be appropriated; a set of appropriation criteria that influence whether a technology will be adopted or what features or functions will be implemented are listed. If none or few of these criteria are satisfied or if the users' negative perceptions of the technology (disappropriation criteria) become ascendant then the technology will be discarded or disappropriated for another, more closely-fitting technology.

The purposes for which young people use mobile technologies form the criteria for appropriating mobile technologies into their everyday lives. Mobile phones and especially text messaging are essential for participants' social lives: "*Meet here*", "*Contacting friends when I'm out*" and "*Keeping in touch*." A university student was observed sending a text message: 'Hi' while walking between lectures; she checked her mobile phone for messages after each lecture. A seventeen year old boy believes that "*A mobile phone builds friendships because you can talk to them more... It's more personal because it is you being called not your home*." A mobile phone is moving beyond a social tool to becoming a lifestyle organiser: "*It's my diary, I store everything in my phone, including numbers such as tax file numbers and bank accounts*." Another girl supported this: "*It is the only way to contact friends. I store all my numbers, reminders there and so it has become easier to make plans*."

Young people without mobile phones appear to be struggling to maintain their social links: they have to rely on public phones when their social group is arranging ad hoc meetings: "*it's so annoying*." One sixteen-year-old girl does not have a mobile phone and says: "*Sometimes it's really hard, all my friends have one, my friends can't contact me*." Her phone was stolen and she cannot afford another one; she resents the high cost of using public phones. A seventeen-year-old boy observed arranging a meeting of friends described mobile phones as "*a pre-requisite for a social life*." He has two friends without phones and finds it difficult to include them in social plans. This suggests a further characteristic of appropriation criteria: 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 10].

Mobile phones are also used for leisure and fun

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activities, sometimes as individuals but often in groups. Group activities included stories of use of SMS in school: "*If you're bored in class then you SMS across the room: 'I'm really bored'*" and observation of SMS messaging between students in a university lecture, as well as downloading, drawing and sending pictures to friends. Some of the boys described how they play games when they're bored: "*People want to fidget; if I'm bored on the train, I start fiddling*." An 'Ode to my mobile phone' was written in a girl's scrap book: "*Oh mobile phone, I am all alone, Where are you?"* However, most participants agreed that they wouldn't buy a new phone just for the games. A sixteen-year-old boy observed "*You just ring people if you want to talk, really bored and want something to do, get off the TV and talk to people. I don't really send SMS though*."

Safety or security was often the catalyst for purchasing a mobile phone. Many parents bought mobile phones for their teenagers so they could maintain contact and supervise their activities. A female university student noted that "*My Mum gets paranoid, I have to ring when I get there*." Mobile phones provide a sense of security: "*My mobile... makes me feel more secure when I'm out, so I know if I get lost or in trouble I can call for help*." One girl had an older car and viewed her mobile as insurance in case of emergencies. Another participant suggested that "*mobiles are a necessity, not just for kids but for everyone...24X7 access... It is important to have that security*."

Mobile phones facilitate contact with the range of people with which the participants interact: "*I use my phone... to contact many people for work, business, leisure etc*." Mobile phones 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 teenagers, mobile phones enable transport arrangements to be made late at night: one scrapbook entry showed a group of young males using their mobile phones "*to ring parents so we can be picked up*."

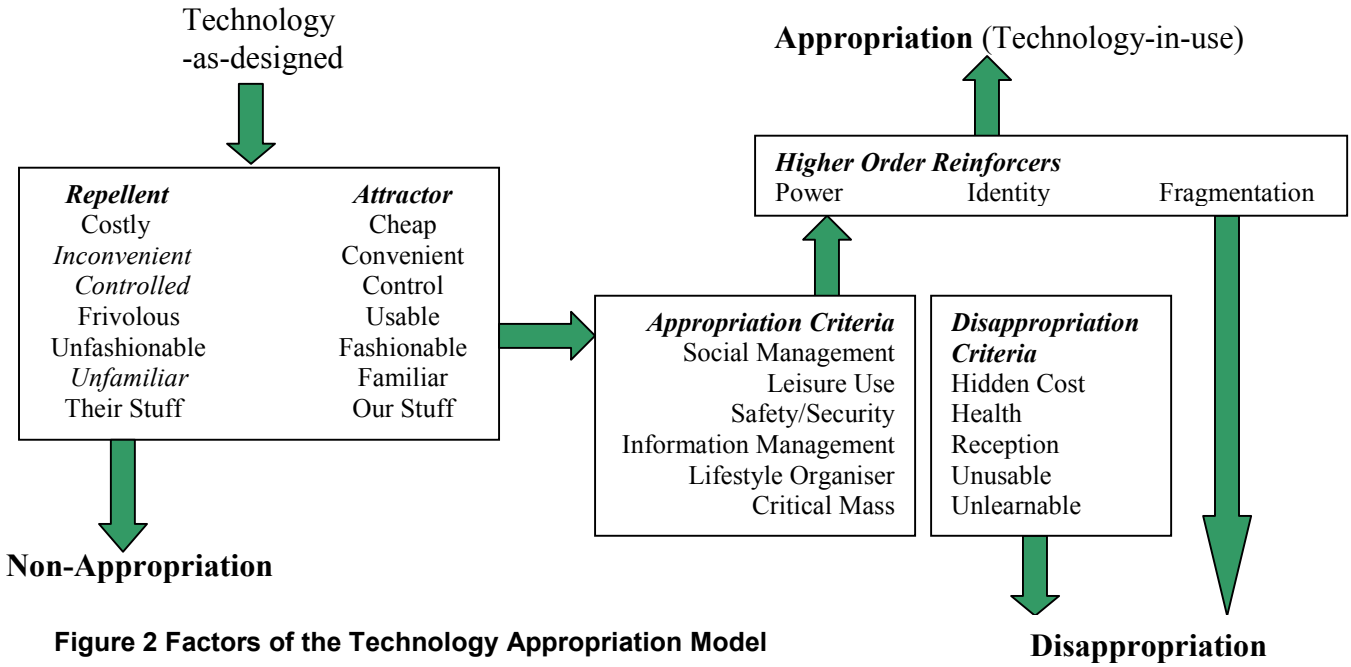

Figure 2 Factors of the Technology Appropriation Model

3.3. Disappropriation criteria

There are a number of negative perceptions of mobile technologies. We conjectured that these could act as barriers to the appropriation of a technology and have called them disappropriation criteria. Participants described the most frustrating aspects of mobile phones.

The most powerful negative aspect of mobile phones is cost. A number of young people experienced problems paying their mobile phone bills. Many school-aged participants use pre-paid phones rather than plans as "*prepaid is easier to control - you don't go over your limit then*." A sixteen-year-old boy observed "*You don't realise how much SMS costs. You think it's only 20 cents a message but it does cost a lot of money eventually.*" This didn't cause him to stop using SMS but he is a lot more careful with the amount he uses it now. Others

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complained about poorly explained mobile phone 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.*" He always goes over the limit on his contract so it is very expensive.

The possible relationship between mobile phone use and brain cancer was raised in each session; in one, all participants nodded when it was mentioned. However, this was not sufficient to affect phone use; one seventeen-year-old male said: "*I'm not negative*".

Poor reception for mobile phones 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 phone use.

Although some features of mobile technologies were perceived as difficult to learn, they did not appear to impede adoption of mobile technologies. For example, the use of profiles to filter callers was described as "*simple, after you've learned how to use it [Lots of laughter]. It's easy to learn, once you get the hang of it.*" One male suggested that it takes about a month to learn and often friends teach them use of the features. Many of the participants had to teach parents (and grandparents) how to use mobile technologies: "*I had to teach my father how to erase text messages. He rang me at work as his memory was full.*" There was much agreement that young people learn about new technologies from friends or from school. The participants suggested that it was more reliable to trust friends rather than commercial sources as *"...they know what they're talking about*" (that is, they know the kinds of attributes that young people are looking for, how the technology will be appropriated and are aware of the knowledge gap/lack of trust with commercial sources). One girl noted: "*With mobiles, the company sends you information and specials in the mail. Every month there's a leaflet with your bill.*"

There were complaints about the size of the buttons. "*It's a hassle typing in words*" but there was general agreement that young people adapt quickly to text messaging. A number of participants noted that small mobile phones were moved from ear to mouth during a conversation, even when they were aware that this is not necessary as the mouthpiece is sensitive enough to capture their conversations; the habit of 'speaking' into the mouthpiece is hard to change. Some young people worried about losing a small phone: "*The (Nokia) 82-10 is very small and I lost it. You want to notice that it's not there.*" One of the male's phone is so small, he thought he'd lost it: "*I had to ring it to find it. It can be too small.*"

However, these negative perceptions do not appear to affect young people's use of mobile technologies: they are not sufficient to overcome the convenience provided by the technologies. 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.*"

3.4. Reinforcers

The third set of factors refers to the three higher-order drivers of mobile technology use: power, identity and fragmentation. Once a technology is appropriated and integrated into the lives of young people, its use is reproduced or reinforced through reference to these higher-order drivers. As long as the technology fits with the needs and lives of young people, its use will be reinforced and stabilised; it may become a mundane part of their everyday lives. At the same time, it will shape their needs and lives, offering new ways of living and interacting in the world (for example, facilitating an ad hoc approach to life, see [3]). We suggest that, as long as a technology satisfies the higher-order needs of young people, its use will be reinforced; when these needs are no longer satisfied or a new technology becomes available that satisfies these needs more completely or closely, then the technology may be disappropriated and its use abandoned. These higher-order drivers of mobile technology use—power, identity/sense of belonging and dealing with fragmented lives—have been identified and are discussed elsewhere [3].

Figure 2 summarises the factors that we have uncovered in the data and illustrates their relevance at the three major decision points in the process of appropriation. Three sets of factors are shown: attractors/repellents, appropriation and disappropriation criteria and the higher order reinforcers. We expect that the attractors are symmetrical, each attractor being associated with an equivalent repellent. However, our data provide no examples of the repellents shown in italicized font. This may be a methodological artefact due to our biased cohort (all our subjects owned a mobile phone and so by definition the attractors had already 'won out' during our subject's earlier experience of the technology), the inability of subjects to voice such issues, or it may be an error in our model's assumption about the bi-polar nature of attractors.

How the factors are incorporated into the decision making and social processes that underlie appropriation, and the relative weightings of and interrelationships between the factors, is currently unclear and is in our view context specific and may not be amenable to abstract specification.

4. Reflecting on the findings

The concept of appropriation is incompatible with a

strong sense of technological or social determinism. Rather, it suggests that technological artefacts provide a range of possibilities for users who shape, and are shaped by, the artefacts. Just as technology as it is designed is a product of various social, political, economic and professional factors [12], so its use will be an outcome of various individual and group perceptions and experiences. Technology is shaped and reshaped over time; at some point, it may stabilise and be integrated into users' lives. Such integration may only be conditional and subject to ongoing reproduction and reinforcement; changes in the strength or importance of appropriation criteria or reinforcers may cause the technology to be disappropriated. This expresses the dual nature of IT "*which focuses attention on how information technology shapes human action through its provision of structural opportunities and constraints, while also recognising that information technology itself is the product of human action and prior institutional properties*" [13: pp 622]. Therefore, appropriation can be seen to combine technological determinism (that affords and constrains certain activities and partly determines the boundaries around the activities that are possible) with social shaping within these boundaries.

5. Conclusion

So, 'Just what do the youth of today want?'. It was clear in this research that young people are adopting a lifestyle rather than a technology perspective: they want technology to add value to their lifestyles, satisfy their social and leisure needs and reinforce their group identity. They assess technology according to their needs rather than as a task-oriented artefact. Reflection on these findings has led to revision of the technology appropriation model—the initial conceptual framework for this research shown in Figure 1—to include the three sets of factors described in the updated conceptual framework in Figure 2. Rich detail has been gathered about the individual factors influencing non-appropriation, appropriation and disappropriation, as shown in Figure 3.

The concept of appropriation has been used and defined in the IS literature but not examined in detail. We have argued that appropriation describes the way that users not only adopt technology but also shape it to their needs and situations of use. The model presented in this paper places the process of appropriation within the wider process of designing, adapting and using technology. It also expresses some of the elements influencing the process, including the factors that influence the initial attraction to a technology and the decision to experiment with and implement the technology. The outcome of this research is an extended and richer understanding of technology appropriation.

It is clear from our research that developers wishing to 'design for appropriation' are facing significant challenges.

- Firstly, they need to consider more than the user's very initial experiences of the device, as their technology will be evaluated by its users over long periods of time. The typical short and targeted tests and evaluations conducted during development of ICT's are unlikely to uncover such medium and longer-term experiences that seem so central to the appropriation outcome.
- Secondly developers need to focus on the significant psychosocial dimensions of the technology; what is needed are development techniques that are sensitive to the more subtle sociotechnical interactions that characterise the Appropriation Criteria and Reinforcers of the model. We are currently engaged in a scenario based design process exploring the implications that these factors have for innovative mobile appliances [see 14].
- Finally, it is unlikely that fundamental research is going to provide normative models and prescriptive guidelines due to the barriers that social activities place in the way of meaningful generalisation.

ICTs are used by young people as integral parts of their everyday lives. Developers of such social technologies, 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 [15] and is an area for future research to build on the findings presented in this paper.

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Proceedings of the 35th Annual Hawaii International Conference on System Sciences (HICSS-35'02)
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Acknowledgements

Cambridge Technology Partners funded this work through their 'Customers of the Future' programme. Thanks to Dr R. Johnston of the University of Melbourne for discussions during the formulation of these ideas.