Cell Phone Culture

Mobile technology in everyday life

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> the initial idea barely counts. It's a gadget, a whatchamacallit, a weakling at best, unreal in principle, ill-conceived from birth, constitutionally ineffective . . . the initial gadget is not endowed with autonomous power, nor is it boosted into the world by a brilliant inventor . . . the initial gadget moves only if it interests one group or another, and it is impossible to tell whether these groups have petty interests or broad ones, whether they are open or resolutely closed to technological progress. They are what they are, and they want what they want . . . every time a new group becomes interested in the project, it transforms the project.
>
> (1996: 119)

Of course, this distinction between the two models of technology innovation, and WAP and SMS, is too neat in itself. The symmetry will be well muddied if we add the case of the Japanese technologies of text messaging and mobile email, famously the i-mode system, discussed in chapter 9.

In emphasising the contingent and even potentially open-ended nature of technology, and also its simultaneously and co-operatively produced boundaries with the social, I reach similar conclusions to Alex Taylor and Jane Vincent in their SMS history, also inspired by actor-network theory. They set out to 'reveal that no simple path can be drawn to explain the developments in and uptake of technologies' (2005: 75), indicating the many and heterogeneous entities that have combined to bring what we understand as SMS about. This shows that the history of SMS, like any other technology, cannot be simply repeated – for instance, as a moral underwriting of the guaranteed, widespread, and lucrative take-up of MMS. In chapter 5 I will consider another case study in how the uncertain and serendipitous logics but also power relations of consumption have shaped cell phone culture – the less-known but equally significant case of disability and accessibility.

5 Cellular disability: consumption, design, and access

Text messaging is a widely known and discussed facet of mobile technologies, a phenomenon which demonstrates the need to appreciate the dynamics of consumption as well as production in order to understand cell phone culture. In this chapter, I further explore consumption, and how the needs, expectations, and desires of possible users are factored into the design of cell phone technology. This time I look at consumption of the cell phone from an angle still little known and understood: accessibility and disability.[1]

Often overlooked as media users and cultural agents, people with disabilities number approximately half a billion people worldwide. Estimates of people with disabilities in any population vary but figures of between 15 and 20 per cent are often cited in many countries (ABS 2004; Metts 2000; on the difficulties and politics of defining and measuring the incidence of disability see Abberley 1992 and Altman 2001). While people with disabilities have had accessibility problems with many technologies, they have also as a group been avid and often pioneering users. Yet in the history of cell phone culture, disability has played a significant yet overlooked role.

In this light, this chapter looks at the consumption of cell phones by people with disabilities and the responses to this by technologists, as a neglected yet richly illustrative component of cell phone culture. To give some background, in the first section I explain contemporary social, political, and cultural approaches to understanding disability. Secondly, I discuss the incompatibility of second-generation digital cell phones for hearing-aid users and Deaf people using teletypewriters. Then I turn, thirdly, to users' cultural and social innovation, exploring Deaf people's use of short text messages (SMS). Fourthly, I contrast Deafness and cell phones with Blind people's non-use and use of SMS. Finally I conclude with reflections on disability, consumption, and cell phones.

Approaching disability and the cell phone

As yet the new ways of studying disability as an integral part of humanities and social sciences are still not well understood – especially when it comes to the undertheorised area of disability and technology. In this chapter I draw upon critical disability studies (Albrecht, Seelman, and Bury 2001; Snyder, Brueggemann, and Garland-Thomson 2002). Diverse and interdisciplinary in its constitution, critical disability studies critiques the dominant understanding of disability via the medical model, where disability is believed to be located in the individual's deficient, sick, or abnormal body. It also opposes the allied, and historically anterior, charity discourse of disability, according to which the person with disability is to be pitied and controlled by benevolent institutions (Stiker 1999). As it has emerged in the United States, Canada, the United Kingdom, Europe, and Australia, critical disability studies theorists typically propose a sociopolitical approach to disability. For instance, British theorists of the social model propose a distinction between an individual's impairments (the bodily dimension) and disability which is socially produced (exemplified in the barriers society unfairly creates for the person with impairments) (Barnes and Mercer 2003). Developed with my friend and collaborator Christopher Newell, my approach seeks to go beyond classic social model accounts by acknowledging the wide range and varieties of impairment and disability; by acknowledging the interaction among gender, sex, race, class, and age in the social relations of disability; by seeking to understand the important cultural dimension of disability; and in proposing the importance of technology in the contemporary social relations of disability.

To date there has been little scholarly work at the intersection of the literatures of social study of science and technology, those of cultural and media studies, and those of critical disability studies (Goggin and Newell 2005c). This is also the case with regard to networked digital technologies now so pervasive and ubiquitous in many countries. Accessibility for people with disabilities is often now a focus of discussion yet still more often honoured in the breach (Goggin and Newell 2003). Important initiatives have been taken in the area of the World Wide Web to make the Internet accessible, yet the overlapping cluster of software, hardware, and networks associated with online communications is proving far more intractable. As the Internet merges with mobile and wireless devices, inclusive and accessible technologies for text, video, and voice communications have been overlooked or only slowly eventuated. As the National Council on Disability has noted:

> There are limitations that make cell phones either inaccessible or difficult to use (and, therefore, possibly undesirable). People who have visual impairments may have the most difficulty reading the display and accessing visual information. People who are deaf or hard of hearing may have difficulty carrying on a verbal conversation and detecting auditory alerts. People with a mobility disability may have difficulty making accurate inputs and simultaneously handling the phone and manipulating the controls. People who have cognitive disabilities may have difficulty understanding metaphors that are used and remembering how to access information.
>
> (NCD 2004: 102–3)

The topic of access generally, and accessibility for people with disabilities specifically, has been much ventilated over the past decade, not least under the not especially helpful rhetoric of the 'digital divide' (Warschauer 2003). Access is certainly important as a concept but it needs to be placed within a general account of technology, culture, and the social. In this chapter, however, my focus is squarely on disability, and indeed the politics of bodies and ability, as an integral part of cell phone culture.

Designing disability: the case of digital cell phones

As we have seen in chapter 2, cellular phones were commercially introduced around the world from the late 1970s, commencing with in-car phones. When hand-held cell phones became available from the mid-1980s onwards these were very bulky. Obviously, at this stage, the cell phone was difficult for many people with disabilities to hold and use. With advances in miniaturisation, computerisation, and manufacturing, cell phones became smaller and lighter. This made them easier to use for some consumers, but more difficult for others because of the dexterity and nimbleness demanded by tiny buttons and interfaces. Many people with disabilities did use cell phones for a range of purposes, including safety, security, and mobility assistance. There is much further to say on first-generation cell phones and people with disabilities (with important perspectives in Von Tetzchner 1991 and Roe 1993), but I will now turn to second-generation digital technologies.

When second-generation cellular systems were introduced around the world from the early 1990s onwards, their new features opened up new possibilities but created new forms of exclusion also:

> The present trend of marketing mobile phones that are smaller but with an ever-increasing number of features, ranging from memory store to calculator functions, is good for many people – but not for everybody. Blind people cannot use text-based information on the screen at all [including phonebook maintenance and use], while those who are partially-sighted have great difficulty with very small displays. Voice outputs are of no use to deaf people and may be difficult for those who are simply hard of hearing. The extensive range of network based facilities like automatic answering and voicemail: functions, text messages and call progress announcements require either useful vision or

> useful hearing, if not both. The Internet-based applications, such as sending and receiving Emails, surfing the net and engaging in e-commerce, are all visually oriented and so exclude blind consumers. Manufacturers and service providers seem to give low priority to solving these problems, for example by offering alternative output modes.
>
> (Shipley and Gill 2000)

Here cell phones illustrate the general proposition that when technology is reshaped it is because of certain sorts of imagined users and use, with particular sorts of 'normal' (or rather normalised) bodies and abilities. Typically people with disabilities do not fit into these categories of the normal (sometimes referred to as 'normate'), and are often not seen either as fitting the ideas of public markets that such normal bodies support. New designs which might allow other uses, by people with disabilities for instance, come often by another route:

> Yet some problems are being overcome: hands-free operation is now offered on some models, not in response to demand by disabled people who have difficulty in using a very small keypad, but because it is wanted by drivers who wish to use their mobile phones in a moving vehicle.
>
> (2000)

For people with disabilities there were also significant difficulties with second-generation cell phones, overlapping other sites of conflict over the technology (such as fears that electromagnetic emission from phones or towers might cause cancer). Not long after the new digital mobile system had been developed and was starting to be introduced commercially in a number of countries in the early 1990s, it was revealed that this technology emitted a high level of electromagnetic interference. Once the existence of these cell phone emissions became widely known, there was much public agitation, indeed panic, as I examine in chapter 6. While the potential for cell phones to cause damage to health and safety was much noticed, there was much less public discussion, let alone awareness, of an associated matter: such interference had the potential to cause a buzzing sound in people's hearing aids, as well as actually making the phones difficult to use for people with hearing aids (Berger 1997; Burwood and Le Strange 1993; ETSI 1993; Joyner et al. 1993; NTAD 1994; Roe 1993). Internationally, phone companies, governments, and regulators put much effort into managing the public outcry. In doing so, they appeared to be motivated by a concern that this new, expensive technology might not be adopted by consumers, despite widespread support from governments.

In effect, cell phone companies regarded hearing aids *rather* than cell phones as the principal problem needing to be addressed. Attention was directed to the need for hearing aids to cope with higher levels of electromagnetic emission,

something that was seen as important given the wide range of technologies emitting such signals – not just cell phones. A European standard was introduced in 1990 requiring hearing aids to be immune to emissions from cell phones. Research was also conducted on removing the source of emission further away from the hearing aid, and eventually 'handsfree kits' were designed for hearing aid users as a solution. Even this solution did not provide assistance for many, and other tactics were required on the part of the disability movement. In Australia, for instance, the disability movement needed to invoke the human rights and anti-discrimination law framework in order for the matter to be successfully addressed: the Human Rights and Equal Opportunity Commission (HREOC) conducted a public inquiry into the matter, which resulted in a conciliation some eighteen months later (Goggin and Newell 2005b; HREOC 2000). Despite such interventions and measures such as 'hands-free kits', the problem remains – and is only partially solved in some countries with the availability of the alternative digital mobile technology, CDMA.

In early 1996 the US FCC convened a summit of the wireless industry, hearing industry, and consumers in an effort to resolve the hearing aid and cell phone compatibility matter (Berger 1997; Victorian 1998). This meeting precipitated the formation of a dedicated taskforce under the aegis of the American National Standards Institute (ANSI) to develop a standard on immunity and emissions requirements and test protocols, which devices are required to meet (Victorian 2004). This work culminated in an American standard (namely ANSI C63.19, see ANSI 2001; also Victorian and Preves 2004). In July 2003, the FCC reopened hearings into the issue. It gave federal imprimatur to the ANSI C63.19 standard, and also ordered a rolling timetable and further accessibility improvements. Other requirements included that within two years every major handset manufacturer and service provider must offer at least two cellular telephones that reduce interference to a level defined in the standard; and that by early 2008, half of all cell phone handsets have interference down to these levels or less (FCC 2003; Victorian 2004).

A related aspect of the construction of disability in digital cellular telephony lay at the intersection of a newer technological system and an older one, with their overlapping yet distinctive cultural practices. Deaf people in a number of Western countries, especially the USA, had developed a rich repertoire of communications and cultural practices using an early form of text communications. Devised in the early to mid 1960s, this technology was variously called the Telecommunications Device for the Deaf (TDD), teletypewriter (TTY), Deaf telephones, or just text telephone (Lang 2000). TTY communication involves two keyboard devices being connected to the telecommunications network to send and receive text messages. Many Deaf people own their own text phones, and, to meet the requirements of legislation such as the 1990 *Americans with Disabilities Act*, TTY payphones may be found in public places such as airports. From its inception this form of text phone

communication by Deaf people relied on the Baudot standard developed for telexes. With the advent and growing popularity of computers and online communication in the 1990s, devices and standards were developed such as V.18 that used the ASCII standard but incorporated the Baudot standard also (Hellström 2002).

The technical breakthrough that had made the TTY possible was a coupling device that allowed sounds transmitted over the telephone to be translated into data, and eventually, alphabetic letters (Lang 2000). Like modems, this meant that TTYs functioned compatibly (within limits) over the telecommunications network. TTYs also worked satisfactorily with first-generation analogue cell phones: 'Analog systems work fairly well with teletype devices (TTYs). Some phones have built in modular jacks into which a TTY can be plugged; other phones can be used with an adapter' (NCD 2004: 103). However, the much vaunted second-generation digital system threatened this interworking or knitting together of technologies:

> Initially, digital systems did not work well with TTYs. Digital wireless transmissions inherently contain errors, but error correction techniques can reduce the problem for speech. Digital networks are less forgiving in the case of the tones generated by TTY devices, however, and the transmission errors can cause characters to be lost or changed, resulting in unintelligible messages.
>
> (NCD 2004: 103)

In his account of deaf people and telecommunications in Australia, Harper observes that:

> When the government decided to move from an analogue to digital telecommunications system in 2000, on the premise that it would improve the wireless network access to a wider range of the Australian people, it did nothing to find a solution for those who were losing a service – Deaf people using TTYs on an analogue mobile service.
>
> (P. Harper 2003)

The consequences of second-generation cell phones for the Deaf community were quite significant. In Australia, for instance, as the national relay provider, Australian Communication Exchange (ACE) argued:

> In the late 1990s, telecommunications access for people with a disability made a tremendous leap forward and the future looked positive . . . However, in three short years since 2000, more than half of the telecommunications network is now not accessible to people who are Deaf or have a hearing or speech impairment despite the existence of the disability discrimination and telecommunications legislation [due to shut-down of the analogue network in 2000, and complete switch to digital mobile networks].
>
> (ACE quoted in Goggin and Newell 2004: 416)

This experience was one shared by Deaf people around the world, underscoring the 'glocal' nature of mobile telecommunications: the shaping of this eminently global technology through local arenas. Internationally, it took concerted pressure from the Deaf community and their supporters, with alliances of users, scientists and technologists, academics, and interested industry across national, regional, and international settings, and also the invocation of general disability discrimination legislation in various countries, before the cell phone manufacturers and telecommunications carriers took this problem seriously.

In the USA, for instance, the Federal Communications Commission, which played a central role in the reshaping of telecommunications and disability through the 1990s (Goggin and Newell 2003), issued a requirement in 1996 that carriers were responsible for ensuring connection of 911 (emergency) calls over digital wireless networks for callers using a TTY. Certainly this was only the beginning of the process: 'The deadline for compliance was extended repeatedly as various wireless carriers worked to provide a solution' (NCD 2004: 104). An industry group, the TTY Forum, comprising carriers, wireless handset and infrastructure manufacturers, TTY manufacturers, telecommunications relay service providers, and disability consumer organisations, worked from 1997 onwards to ensure the networks would be able to carry 911 calls via TTY by the mid-2002 deadline set by the regulator (Harkins and Barbin 2002; NCD 2004). A number of larger providers met this deadline and implemented wireless TTY compatibility, including AT&T Wireless Systems, Cingular Wireless, NexTel, Sprint PCS, T-Mobile (formerly Voicestream), and Verizon Wireless (TAP 2002). Despite this, a number of carriers still petitioned the FCC for an extension.

There were certainly some genuine difficulties faced in the endeavour of achieving compatibility of cell phone networks and handsets with TTY devices. These included redesign to accommodate the speed and tone of TTY Baudot signals and 'setting standards for the interface between TTY devices and digital wireless cell phones operating with several different digital standards' (TTY Forum 2002; NCD 2004: 105). At the end of the process, however, there is evidence to suggest that in the USA reasonable compatibility has been reached between cell phones and TTYs in non-emergency situations, though difficulties still remain with wireless 911 TTY calls (especially related to some of the equipment used by operators or emergency services answering calls) (NCD 2004: 105). However, not all cell phones are compatible with TTYs, and consumers have been urged to test their TTY with their wireless provider (TAP 2002). Elsewhere the problems of TTY and mobile compatibility also remain.

Seeing telephony: deaf people and text messaging

We have seen how the needs and desires of hard-of-hearing and Deaf cell phone users were not initially understood or envisaged as part of the design of second-generation digital mobile networks. Also that this set of design and consumption issues has not been widely noticed and discussed. To explore these issues further I now turn to a case which has received significant publicity, Deaf people's invention of text messaging.

Deaf people have long used text communications. As we have seen, from the 1960s onwards Deaf people had established a set of communicative and cultural practices around the TTY. Coupling TTYs with cellular devices, something attempted by some users with analogue cell phones, offered new telecommunicative possibilities for Deaf people. While the introduction of digital cell phones made mobile TTY communications difficult, another unexpected possibility was gradually opened up – text messaging. While a definitive history of the Deaf adoption of SMS has yet to be written, the outlines of this episode have now become widely known:

> The deaf have taken to this technology as an answer to their prayers. As texters in countries like Australia, Britain, and Israel, where the mobile phone service providers have agreed to interconnect their networks, they can take their means of communication with them as far as they can go and reach anyone who has a mobile phone.
>
> (Power and Power 2004: 334)

But although there have been few detailed studies of Deaf people's adoption and use of text messaging (an exception being Bakken 2005), one central theme in available accounts is that users can now communicate with other Deaf and hearing people without the intermediary of a human TTY relay operator. Power and Power point out that abbreviating text has 'long been familiar to [Deaf people] because it is used in TTY conversations', and that the characteristics of the SMS genre 'suit the sometimes-limited English of Deaf people' (2004: 335). Indeed there is some evidence to suggest that the rate of use of SMS among Deaf people is higher than their hearing counterparts (P. Harper 2003; Power and Power 2004).

Certainly Deaf people's creative use of cell phones caught the attention of mainstream media:

> Over the last few years, the mobile phone has emerged as a popular device for what at first may seem an unlikely user group: the deaf and other people who are hard of hearing . . . This usage shows how a group of people can take up a technology that was not initially designed or marketed to them, and adapt it to suit their own needs and purposes.
>
> (Wurtzel 2002)

Service providers in a range of areas including emergency services, police, and education institutions began to realise the potential to reach Deaf people via SMS.

Just like the rise of text messaging in general, once mainstream cell phone companies noticed the Deaf community's avid use of text messaging, they were keen to market to Deaf consumers, and also publicise this use for wider, public consumption. In September 2001, for example, Vodafone New Zealand sponsored 2001 Deaf Awareness Week:

> Text messaging is more than just a youth craze turned mainstream – it also gives deaf people the chance to communicate via mobile phone . . . Vodafone New Zealand's GM Company Communications, Avon Adams said it was good to see text messaging providing options for the deaf community. 'Text messages are free to receive and only 20c to send to anywhere in the world. They open up a realm of possibilities to deaf and hearing impaired people who can't make use of voice-based communications,' said Ms Adams.
>
> (Vodafone NZ 2001)

Redesign of the technology in light of such use was slower in coming: 'As the technology was not developed with this community in mind, operators and manufacturers have been slow to tailor offerings for the deaf and hard of hearing' (Wurtzel 2002). One problem for Deaf people is that SMS only supports asynchronous rather than real-time interaction (P. Harper 2003) – as it is a store-and-forward technology resembling email in this respect – despite the often very fast communication it can often afford. Also text messages need be written in hearing languages such as English rather than native sign language, and the frequent text messaging required by Deaf users can be quite costly.

Despite such challenges, Deaf users have also avidly taken up devices such as text-messaging pagers and portable digital assistants – with the T-Mobile Sidekick becoming a cult object among some communities of users (Kilner 2005). Mobile devices are also being used with Internet protocol relay services, for instance with America Online and MCI's 'My IP-relay' service launched in 2004 (AOL and MCI 2004). This enables Deaf people to have their phone calls transcribed by relay operators, and sent to them over the Internet, and then to have their instant message replies read back to the hearing person by the relay operator (LaVallee 2005).

As new textual media, the cell phone and associated technologies, are deeply involved in significant and hotly debated transformations in Deaf identity and community: 'These technologies have begun to alter how Deaf people contact and

communicate remotely with each other' (P. Harper 2003). Like wider debates regarding cell phones that have had an important function in shaping this media culture, there are those who praise the utility, function, freedoms, intimacies, and sociability such technology brings to Deaf people and others who lament the threat to older social forms. For example, face-to-face contact and gatherings have been much prized by Deaf communities, not least as a way to communicate via the visual and tactile medium of native sign language. In this respect Deaf clubs have been an important social and cultural institution, and fears have been expressed that the mediated communications offered by SMS, instant messaging, and the Internet will lead to an attentuation of social ties and cultural norms, and the disappearance of important customs (see Kunerth 2005, and response from Laird 2005). These fears have been more generally raised regarding cell phones, and have a long history in the reception of new media (Marvin 1988; Winston 1998). I would also suggest that notions of the cell phone are being socially and culturally shaped by the innovations of these users, and their imaginings of the technology. Thus SMS takes its place in a historical ensemble of technologies and communicative and cultural practices, including TTYs, fax machines, and, more recently, electronic mail and instant messaging (Bowe 2002; Lang 2000; Power and Power 2004).

Blinded by SMS

From the celebrated Deaf use of SMS, we now move to a contrasting case where a disability culture and its desires and needs regarding a technology have not been reflected in values, design, or narratives of use. In doing so, I am mindful of the problematic, dynamic, yet intensely invested categories of 'Deaf' and 'Blind', and the entire vexed taxonomic enterprise of knowing the truth of a person via an impairment label (for a critique of this see the opening chapter of Goggin and Newell 2005a).

As with people with disabilities in general, and Deaf users in particular, a useful starting point is the thesis that for Blind users the cell phone has gone hand-in-hand with new personal and collective possibilities. As Jolley notes:

> People who are blind have enjoyed the flexibility that results from mobile communications. Using their mobile phones they can find each other more easily in public places, and they have the added security of being able to make a phone call if they are lost or feeling endangered.
>
> (Jolley 2003: 27)

Yet, to propose an antithesis, the technology has not been imagined or designed with Blind users in mind.

Jolley usefully summarises a number of taken-for-granted features of cell phones that Blind people most often cannot use:

> People who are blind have very limited access to the standard features of mobile phones. In general terms they can only make calls by manually entering the number to be called, and they can receive calls if the phone rings or vibrates. But they do not know the battery strength, the signal strength, if the PIN has been wrongly entered, if calls are missed, if the phone is accidentally on divert, or anything else that is shown on the screen. They cannot use the menu system, the telephone directory system, or anything but the most elementary speed dialing features. And, of course, they cannot use SMS. These features have been introduced gradually, as network services have been enhanced, and as new models of mobile phones have been released.
>
> (2003: 27)

People with low vision also face problems:

> Many people with low vision find it difficult to find a mobile phone with a large enough, brightly lit screen that they can comfortably read. So if they cannot read the screen, people with low vision face the same denial of access to the features of their mobile phones as do people who are blind.
>
> (2003: 27)

The author of a comprehensive series of articles on cell phone accessibility for Blind users for an American Federation of Blind publication (Burton 2004, 2005a; Burton and Uslan 2003, 2004a, 2004b; Burton et al. 2003) offers this account:

> In the early days of cell phones, when they were used only to make and receive calls, accessibility was not a major issue. As long as visually impaired people could tactilely identify the control buttons on the cell phone, it was no problem to make and receive calls. However, they were left out of the loop when the evolution of cell phones brought display screens and other new advances, such as phone books, text messaging, and e-mail, into the mix. Although people who are visually impaired were still able to perform the basic functions of making and receiving calls, the manufacturers did not design these new phones in a way that would allow them to independently access the new, more advanced features. There was no text-to-speech functionality to accommodate cell phone users who are blind, and there were no display screens with the visual characteristics, such as large fonts or highly contrasting colors, that would accommodate users who have low vision.
>
> (Burton 2005b)

As cell phone manufacturers and service providers did not collectively envisage and design mobile technological systems with affordances and capabilities for Blind users, it has been largely left to specialist disability technology providers to design

purpose-built workarounds. This could only be done with high-end phones such as Nokia's Symbian Series 60 that allowed third parties to add software programs and applications to cell phones (Molloy 2004). The company Cingular Wireless, for example, has licensed for the US market a software application called TALKS. TALKS is able to read screen-based menus, instructions, and content, and convert these into synthetic speech, using either the phone's speaker option or plug-in earphones or headset. Another application is Mobile Speak. It is designed to work with the Symbian series 60 operating system, to be carrier independent, to access 'most of the functionality of the device', and is offered in a number of languages (to date mostly English and European languages but also Turkish, Arabic, and Chinese). As well as a number of Nokia phones, it also works with the Siemens SX1 (Mobile Speak 2005). Another product is offered by Code Factory, a Spanish developer of 'software solutions for the blind and visually impaired' (www.codefactory.es). Code Factory also offers a related product called Mobile Accessibility, 'a complete mobile phone solution for the blind and vision-impaired' (Code Factory 2005). There is much to be said about the politics of artefacts here, and the inscription of the boundaries between mainstream and specialist technology. However, one index of these matters is the prohibitive price of adaptive software.

As well as applications for or adaptions of existing phones, in 2003 Spanish technology company Owasys announced the world's first cell phone specifically designed for Blind people. (After all, producing a *national* cell phone has been an important project for some countries, so why not a *disabled* cell phone?) When the phone was exhibited in Britain a company representative explained their thinking:

> We thought there were parts of the consumer market whose demands were not very well covered by the big players . . . From our conversations with ONCE (the blind people's organisation in Spain) and RNIB here in the UK, it was clear that there was a need among blind people for a product like this.
>
> (Adams-Spink 2003)

It is not clear to what extent Owasys's dedicated product has been taken up by Blind users, or whether most are more comfortable with a screenreader or application option (at least those who can afford it, and have the skills and training to use it). One difficulty may be slow and costly progress on approvals in different countries. In addition, the Owasys phone has fewer features than a phone running a screenreader, and carries a comparable price to a high-end phone plus screen-reading software.

As the capabilities of mobile devices expand, so too do creative options emerge, extending the capabilities of the cell phone for Blind people. In mid-2005 Motorola announced a software upgrade for one of its phones, to enable text to speech reading of menus, messages, and other screen-based phone features. A technology company called vOICe, – 'See with your ears!: Wearable Bionics used by the Blind Aim: Vision through Brain Plasticity' – has developed an aural camera phone designed for Blind users (The vOICe 2005), which translates images into soundscapes which are transmitted to the user via headphones (Sandhana 2003). The company has a utopian vision for its innovation:

> Within a decade, second-hand camera phones could become an affordable platform for use of The vOICe by blind people living in developing countries! These phones can at the same time serve many general communication, Internet access and computing needs for the sighted poor, while doubling as a digital camera.
>
> (The vOICe 2005)

There is other software now available that allows a person to use a phone camera to identify the colour of objects (via a 'talking color identifier'). These offer ingenious, if relatively untested, reinterpretations of the visual cultural and multimedia features that now ship with the majority of cell phones.

If such options are in cell phones and mobile technologies are available for disabled users, these also reconfigure technological and cultural possibilities for all users. Significant numbers of Blind people are indeed now using text messaging and other data features on cell phones, as well as portable digital assistants, wireless laptop computers, and other devices. These innovative uses of mobile and wireless technologies build on and complement other media innovations of Blind users, such as braille, radio, Internet, audio recording, podcasting, blogging, talking books, and new digital publication standards such as Daisy (www.daisy.org). Outside Blind community and cultural lists, websites, journals, and circles, there is little recognition in other audiences of innovative uses of cell phones (cf. Goggin and Noonan 2006). Not surprising, perhaps, that progress in reshaping cell phone technology for Blind users is still slow at the time of writing (HREOC 2005).

Noonan's 2001 appraisal of the situation sadly remains a valid diagnosis:

> there are only two significantly developed zones of [blindness] accessibility momentum – PC access, predominantly via Microsoft's Windows32 operating systems; and Web accessibility, predominantly driven by the WAI [Web Accessibility Initiative] . . . This is important to consider when we note recent projections in the IT industry that more than half of the internet connections by 2002 (or 2005 in other estimates) are expected to be from non-PC devices. This means that they will be from technologies which, currently, have no means of accessibility to their visual output. This raises the important question as to how people will be able to access set-top-boxes, WAP-capable mobile phones, personal organisers, smart domestic appliances and the like, which are solely visual (and non-textual) in output.
>
> (Noonan 2000)

The implications of such an impasse in technology are far reaching. SMS is now intensively used around the world, especially by young people, and is often an important aspect of cultural participation and social membership. Such emergent norms mean that Blind people's lack of access to SMS, and neglect in the design and shaping of mobile technologies more broadly, can lead to significant social exclusion.

Cell phones and next-generation disability

As the sources cited here make clear, study and discussion of disability and the cell phone is largely to be found in the specialised technical, service provider, or advocacy literatures and fora. There is still little discussion of disability to be found in telecommunications, new media, or Internet studies literature, and these are even fewer scholarly discussions of social and cultural aspects of mobile communications technologies. In seeking to stimulate such inquiry, I have been able to sketch only briefly three different case studies in disability and the cell phone. There is a great deal of empirical work that remains to be undertaken, first to establish the histories of disability and technology touched upon here, and second to debate and theorise these. This is an important research agenda, not only as a matter of human rights and justice but also because these narratives unsettle our taken-for-granted theories of technology. From a different perspective, I would note that Internet, games, and new media studies have made much of the role of the user in appropriating, domesticating, developing and actually producing networked digital technology and its associated cultural forms and content. There is much interest among cell phone and mobile technology scholars in questions of use and consumption. People with disabilities are mostly overlooked as users, consumers, and audiences, when they could be profitably credited as everyday, do-it-yourself consumer-producers of cell phones and media.

To understand cell phones and disability adequately, indeed cell phone culture in general, one needs to confront some deeply ideological notions (or myths) of technology. The term ideology is appropriate because it marks the operation of power: the social construction, or shaping, of disability in technology has decisively to do with relations of power (Goggin and Newell 2003). It is often very puzzling to those dedicated to the pursuit of accessible technology for people with disabilities that time and time again new technology brings not the much vaunted benefits (indeed salvation), but instead insidious new forms of exclusion, regulation, and control. Why, the proponent of accessible technology asks, if accessibility and 'universal design' are such simple, fruitful, and potentially profitable principles (NCD 2004), do we nearly always find that technologies are designed without imagining that people with disabilities will be among their users? My suspicion is that stubbornly resistant aspects of achieving inclusive technologies form part of a larger project of dismantling the oppressive power

relations of disability in our societies, in which, *mutatis mutandis*, people with disabilities have long been seen as *other*, indeed, all too often still, as inhuman (Goggin and Newell 2005a).

While power is very palpably to the fore here in the construction of disability and accessibility in cell phone culture, it also is very much a part of other aspects of the technology. I will discuss a different aspect of power as we now move from consumption to representation and regulation – and the subject of mobile panics.

5 Discussing mobiles in Italy, Leopoldina Fortunati cites the case of SMS as evidence for her contention that the 'impossibility of sustained communication over long periods . . . has led to a new cultural interest in brevitas (the Latin virtue of brevity), and, paradoxically, has reconciled many people to writing who would not otherwise have done so' (Fortunati 2002a: 44). She is interested in the way that the cell phone 'frustrates users' attempts to communicate', and that the 'mobile phone does not seem a very communicative instrument' (43).

5 Cellular disability

1 This chapter is very much based on an earlier piece co-written with Christopher Newell, whom I thank for allowing me to rework and incorporate it in this book. The earlier version was published in A.P. Kavoori and N. Arceneaux's 2006 collection *Cultural Dialectics and the Cell Phone*.

6 Mobile panic

1 The place of the beach in settler Australian culture is well known, and it has also played an important role in the early days of cultural studies, most flamboyantly in John Fiske's 'Surfalism and sandiotics: the Beach in Oz popular culture' (Fiske 1983).

7 Intimate connections

1 Walker and Wright note that security 'was perceived by some in the first days of GSM as an unnecessary expense' (2001: 385). Whereas the focus initially was on securing the user's communications and data against eavesdropping, authentication of the user identity (and avoidance of fraud) later became a much more important consideration and rationale.
2 That encryption in GSM was a precursor to a loosening up of encryption is very interesting. The debate, especially in the USA, revolves around balancing the right of a citizen to secure the privacy of personal conversations and transactions versus the countervailing need of the state's security and law enforcement agencies reasonably to intercept communications. In the mid to late 1990s debates on the availability of encryption of Internet technology to citizens in general was a cause célèbre when the US government wished to legislate to restrict this, as in the debate over the so-called 'clipper chip' (see Gurak 1997).
3 Made prominent with the advent of the Internet, a 'celebrity sex tape is a home video of sex acts, as performed by a celebrity and his or her partner, which finds Internet and/or bootleg distribution and is made available to an audience for which it was not intended' (*Wikipedia* 2006a).

8 On mobile photography

1 Quoted in Fukutomi 2003 as cited in Okada 2005.
2 My thanks to Larissa Hjorth for this observation.
3 My attention was drawn to this by Joi Ito's chronology of milestones in moblogging, part of his handy 'Moblogging, Blogmapping and Moblogmapping related resources' (Ito 2003).
4 Because of its then limited capabilities WearCompu2 was not widely adopted, but in 1997 Mann expressed a desire to revive this 'BlindVision' project of the 1980s (see Mann 1997).
5 In computing parlance a kludge is a 'machine, system, or program that has been improvised or "bodged" together; a hastily improvised and poorly thought-out solution to a fault or "bug" ' (OED). Though, as another source points out, a kludge is 'a method of solving a problem . . . that is inefficient, inelegant, or even unfathomable, but which nevertheless works' (*Wikipedia* 2006b).

9 The third screen

1 WAP is a layered architecture, consisting of a series of 'stacks'. In this regard it resembles the way the World Wide Web language and protocols run across the various Internet protocols and devices. However, in the original WAP specifications there was no direct correspondence between WAP and Internet protocols, so translation between a WAP-enabled handset and Internet server had to be achieved via a WAP gateway.
2 It was possible to find a solution to staying connected with the Internet Protocol version 4 (still current at the time of writing), but a better technical arrangement was created as part of Internet Protocol version 6, now being steadily implemented (see http://www.ipv6.org).
3 Rather than WML, WAP 2 uses a markup language called XHTML Mobile Profile (XHTML-MP), based on XHTML Basic, a W3C standard (for an accessible discussion on the design implications of this see Worthington 2005).
4 The Digital Video Broadcasting (DVB) project is 'an industry-led consortium of over 270 broadcasters, manufacturers, network operators, software developers, regulatory bodies and others in over 35 countries committed to designing global standards for the global delivery of digital television and data services' (http://www.dvb.org). The family of DVB standards are handled by a Joint Technical Committee of the Centre for Electrotechnical Standards (CENELEC), the European Broadcasting Union (EBU), and the European Telecommunications Standards Institute (ETSI), which latter publishes the standards.
5 Writing in 2003, Tuttlebee et al. note that the 'case for IP in a broadcast network – with constant bit-rate streams requiring guaranteed QoS [quality of service] – is still under evaluation . . . implementation in broadcast networks is unlikely to be universal and is probably some years off'. While technology development has been very rapid in mobile television, this assessment still holds much of its veracity in early 2006.
6 In November 2005, the music video for vocalist James Blunt's new single 'Goodbye My Lover' premiered on 3's mobile service was available for download to their customers, a trend apparently started by Robbie Williams's 'Misunderstood' in 2004 (Gibson 2005). Major label EMI's digital media director commented that she 'can't see a single campaign going forward that doesn't have a mobile element to it, from the lowliest act to the biggest global superstar' (Gibson 2005).

10 Next gen mobile

1 The enthusiastic reader may consult a number of detailed accounts of the byzantine 3G standards endeavours, not least the surprisingly entertaining participant treatments in Hillebrand 2001b.
2 I have focused here on the two major 3G systems, which are both broadly Wideband