

Students and mobile devices

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Many educators advocate, promote and encourage the dreams of agency, control, ownership and choice amongst students whilst educational institutions take the responsibility for provision, equity, access, participation and standards. The institutions traditionally procure, provide and control the technology for learning but now students are acquiring their own personal technologies for learning and institutions are challenged to keep pace. These allow students to produce, store, transmit and consume information, images and ideas; this potentially realises the educators' dream but for institutions is potentially a nightmare, one of loss of control and loss of the quality, consistency, uniformity and stability that delivered the dreams of equity, access and participation. This paper traces the conflicting dreams and responsibilities.

Keywords: mobile devices; ownership/agency; institutional procurement

Introduction

This paper was specifically a response to the challenge represented by the theme of the Association for Learning Technology Conference in 2009 – that of dreams and responsibilities, and the challenge of relating and reconciling them.¹ It was also a response to a more general paradox – that of relating and reconciling individual agency and autonomy with wider access and equity within educational institutions.

Mobile devices include smart-phones, games consoles, digital cameras, media players, netbooks, in-car satellite navigation and handheld computers. Almost every student owns one and uses one, often more than one. Not only do they own them and use them, but they also invest considerable time, effort and resources choosing, buying, customising and exploiting them. These devices express part or much of their owners' values, affiliations, identity and individuality through their choice and their use. They are both pervasive and ubiquitous, both conspicuous and unobtrusive, both noteworthy and taken-for-granted in the lives of most – but not all – students.

This thought piece looks at these devices in the hands of so many students and the challenges and opportunities that these devices represent for the support and provision of learning, and indeed for the meaning and nature of learning. The phrase 'student devices' is used not to signify mobile devices in general or the purely technological characteristics of mobile devices. The phrase is used emphatically to explore the educational and institutional implications of students' choices. It is understandable that much of the discussion will focus on mobile phones

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considering their massive dominance in students' lives. The devices themselves are important, as are the systems, networks and infrastructures that support them. The probable trends in functionality, availability, ownership and use are also important, as is the operation of the market-place through the networks, content providers, service providers and hardware manufacturers, in determining what is promoted and what is ignored.

This thought piece explores these issues and looks at the challenges, from the practical to the philosophical, that universities face if they are to move in a direction that is positively aligned to this dramatic rise in students' own devices.

The technology, and its ownership, access and use

If we look at mobile devices and technologies, especially if we make a comparison with desktop technologies, what we see is diversity, transience and incoherence. There is no standard footprint or format. The devices come in all sorts of shapes and sizes, from slim matchbox to sturdy paperback book, landscape or portrait. They may open out, slide open or neither; they have all sorts of keyboards (some virtual, some real) and screens; they may respond to touch, gesture or stylus; they may capture or play various media and connect to various networks and peripherals. They run various operating systems, applications, networks and connectivity, any of which will change overnight, even if those are supposedly stable and standard.

These devices are developed and designed for various retail niches and corporate markets, certainly not for learning, however informal. This should not be a surprise; educational technology has always been parasitic, originally co-opting desktop computers intended for corporate business customers and now trying to co-opt mobile devices intended for individual lifestyle customers. This process continues today (Hemmi, Bayne, and Land 2009) and has been rigorously explored (Bar, Francis, and Weber 2007). Not one of these technologies was intended for educational use and so they continually challenge educationalists to develop educationally sound applications.

Sales figures (for example, Kumar 2004) show that many buyers and users clearly prefer specialised, dedicated devices rather than any generic and more general-purpose device. Clearly many buyers echo Rolt's (1947) remark (quoted in Trinder 2005, 24) that "Manifestly it is better to use simple tools expertly than to possess a bewildering assortment of complicated gadgets and either neglect or use them incompetently". Therefore, whilst we have seen the migration of most personal digital assistant functionality into phones, this has not lead to the emergence of some generic converged device or even some generic converged platform or architecture, and the marketed is segmented by "understandings of the consumer held by those in the mobile operators industry" (Green et al. 2001, 1). Furthermore, consumer choice favouring divergence, individuality and constant innovation coupled with device design and manufacture targeted at niches and an architecture based on dedicated closed boxes means that this situation will not change. We can say only that the devices owned by students will be, at best, poorly suited to learning. They will all be different, they will be changing – often for reasons that are not technical, not educational and probably not even rational or foreseeable.

This is not a helpful picture for universities hoping to plan around mobile devices. There is reassurance in prediction; it puts change in a context and gives a basis for planning.

The social aspects of mobile devices

The personal, cultural and social aspects of these trends hinge in many respects on the essential difference between desktop technologies and mobile technologies, a difference that means we can ignore the former but not the latter. Interacting with a desktop computer takes place in a bubble, in dedicated times and places where the user or student has their back to the rest of world for a substantial and probably premeditated episode. Interacting with mobile technologies is different and is woven into all the times and places of students' lives. Mobile phones have created "simultaneity of place" (International Telecommunications Union 2004, 20; paraphrasing Plant 2002): a physical space and a virtual space of conversational interaction, and an extension of physical space, through the creation and juxtaposition of a mobile social space.

Mobile devices demolish the need to tie particular activities to particular places or particular times. They are reconfiguring the relationships between public and private spaces and the ways in which these relationships are penetrated by mobile virtual spaces. Virtual communities and discussions had previously been mediated by static networked PCs in dedicated times, places and spaces. Now, mobile technologies propel these communities and discussions into physical public and private spaces, forcing changes and adjustments to all three as we learn to manage a more fluid environment. The private "is no longer conceivable as what goes on, discreetly, in the life of the individual away from the public domain, or as subsequently represented in individual consciousness" (Cooper 2002, 22). Bull has commented on the use of mobile devices to re-appropriate public space or work time back into the private:

The use of these mobile sound technologies informs us about how users attempt to 'inhabit' the spaces within which they move. The use of these technologies appears to bind the disparate threads of much urban movement together, both 'filling' the spaces 'in-between' communication or meetings and structuring the spaces thus occupied. (Bull 2005, 334)

Mobile technologies are redefining discussion and conversation. Rather than these being set aside as something done at certain moments, for a delimited stretch of time, usually in a private space (or semi-private phone 'box' or 'booth'), Sheller (2004, 5) says there is now "a constant flickering of conversation". Furthermore, in order to manage the intrusions of mobile calls and conversations into real time and space (or *vice versa* perhaps) we are evolving a set of non-verbal actions and interactions with the mobile phone in public. In order to maintain discourse and connectedness across different spaces we are devising and learning new protocols. We are devising new tie-signs, those gestures that express or reinforce a social bond (Goffman 1971), in order to manage simultaneous conversations in real and virtual space, allowing us to service different types of conversation without offending either our real correspondents or our virtual ones. We have to manage enforced eavesdropping (Plant 2002, 47) and adopt civil attention (Goffman 1971) where our neighbour in the train or bus, for example, holds a private, intimate and probably embarrassing conversation with some unseen other and we have to make gestures that signal that we are not paying any attention, averting our gaze or shifting our stance.

Mobile devices are eroding established notions of time as the common structure, for scheduling, coordinating and organising activities and events. Various authors talk about the "approx-meeting" and the "multi-meeting" (Plant 2002, 31), about "socially negotiated time" (Sørensen, Mathiassen, and Kakihara 2002, 3) and the

“micro-coordination of everyday life” (Ling 2004, 69) alongside the “softening of schedules” (Ling 2004, 73) afforded by mobile devices as we use them to adjust our schedules and our commitments on-the-fly as events unfold. Finally, Nyiri (2007, 301) says, “with the mobile phone, time has become personalized”, whilst Fortunati says, in a piece that addresses and analyses many of the issues covered here, that:

The mechanical representation of time is more and more unacceptable at a social level. In other words, the abstract, uniform and unitary time of the clock is sinking further and further down in relation to electric and satellite time. With the possibility of perpetual contact, the mobile phone ends in fact by shaping time as a container of potentially continuing connection. (Fortunati 2002, 517)

Mobile devices are also eroding physical place as a predominant attribute of space. *Absent presence* (Gergen 1996) describes situations where groups of people physically together are all connected elsewhere. Mobile devices now enable us to carry our various virtual communities with us but physical communities – the family, the town, the university, the cohort – become devalued. Mobile devices are creating communities and groupings, sometimes transient and virtual, arguably at the expense of existing and traditional ones. In some cases, this is because increased connectivity and functionality have meant that social networking sites have adapted and migrated to mobile devices; in other cases, social networking sites native to mobile devices have developed and flourished.

Sometimes the device itself – the early Walkman (du Gay et al. 1997) and the first cell phones, for example – signifies membership of a community. In other cases, specific groups or communities use the devices in their own exclusive way: txtspeak in its early days served this purpose (Shortis 2009 and Thurlow 2003 both give considerable context to this remark), and around the world different communities use the missed call differently (Donner 2008). More significant though, mobile devices have catalysed a range of communities, transient and ephemeral perhaps, and sometimes described ‘smart mobs’, groups of interconnected people forming a distributed intelligence, around particular political, artistic or social issues (Rheingold 2002). With each of these groupings come new norms, expectations, ethics and etiquettes and shifting ideas about the self and identity. Our social networks are part of the construction of our identities in the sense that we say who we are and we learn who we are by who we associate with and by who we are comfortable being seen associating with. Increasingly, online social networks are part of this identity construction and these are becoming mobile, perhaps reintegrating the virtual and the actual.

At the mLearn conference in 2007, Charlie Schlick, Product Manager of Nokia, described company practice in talking of mobile phones as “our new private parts”. These devices are personal, universal and closely linked to identity, and in talking about student devices we must recognise how closely they are bound up with a changing sense of self. Some authors describe personal mobile devices as becoming “embodied” (for example, Rettie 2005). Other authors describe them as becoming prosthetic. Raul Pertierra says:

Unlike desktops and other immobile technologies, mobile phones more closely resemble tools or prosthetic devices as extensions of the body. They become extensions of the hand, allowing us to connect anytime, anywhere, with anybody. Bodies themselves become writing devices as phoneurs negotiate new urban spaces. (Pertierra 2005, 27)

The educational implications of student devices

Many of the implications of these remarks for universities are still unclear. However, we can tease out some of them. There is the purely tactical implication: universities are fundamentally sound but need to tinker with perhaps timetabling, network security, outreach, staff development, assessment regimes, the wording of acceptable use policies or the constituents of blended learning. An obvious implication for working with students is the need to recognise that expectations about face-to-face interactions are now fragmenting more than ever. Different groups of people have different ideas about courtesy, especially in relation to mobile phones; there will be different expectations about whether to answer a call or a text whilst in an interview, tutorial or lecture.

Mobile devices are defining and supporting new communities, and their aspirations, attitudes and idioms must be understood and addressed if they are to have parity of access to university education. These transient and mobile communities have their own norms that determine what is acceptable. These norms might govern etiquette, taste, language, values and ethics, and the educators must understand these in order to work effectively within these communities.

The services, connections, discussion and content – and university education is all of these – are no longer seen as dependent on face-to-face contact at predetermined times. Educational provision is built around time and place: the timetable, hand-in dates, the classroom, the cohort, the deadline and the laboratory. These observations suggest that the education system, especially the formal university system, is becoming out of step with how many students perceive the world they live in and that, irrespective of the significance and reaction to student devices, changes are needed in keep universities aligned to a changed and mobile society.

Physical locatedness is further weakened by the increase in cloud computing (as described in Wiess 2007), the phenomenon of data, applications and processing moving away from specific hardware hosts and into the Internet. The combined consequence for universities will be to challenge the primacy of institutionally controlled desktop computers. A different medium-term trend will be for these activities to move into the environment, into buildings, furniture, vehicles or clothing, and to become ambient and pervasive (Satyanarayanan 2001). The consequence for universities will be to accelerate the convergence of physical architecture and virtual architecture, and to blur the boundaries between institutional space, social space and personal space, and the outside world. At the same time, learning and knowledge are less anchored in physical artefacts. eBook readers and media players, for example, mean that books and records are longer necessary to store and transmit literature and music. Video-on-demand is another part of the transformation of live social performance into consumable artefact and now into disembodied asset.

These are all part of an epistemological revolution (for example, in the sense broadly outlined in Des Bordes and Ferdi 2008), a phrase used to express the fact that computers and now mobile technologies are revolutionising what we know and how we know it, and hence what we learn and how we can learn it. In talking in these terms, however, we should be careful not to obscure the nuances and differences between individual devices and technologies and the various ways in which different cultures and organisations with society adopt and adapt them. To portray the demography of information and communications technology (ICT) access as simply “digital immigrants” and “digital natives” (Prensky 2001) is to over-simplify a situation where

different technologies, desktop and mobile, are adopted by different communities, cultures and sub-cultures in different ways at different rates, a point made elsewhere (Selwyn 2009).

These factors are significant to learning and education, and to how the universities tackle the challenge of student devices, because they reveal how central these devices and technologies are to the lives of almost everyone in our society.

Ownership of technology, knowledge and learning

These changes and trends will cause significant shifts in the idea of ownership; specifically, the ownership of technology and of knowledge. We mean here that more students and a greater range of students will buy and possess mobile devices and access information. We also mean, however, that through this process these students will gain greater confidence, agency and familiarity with the technology exemplified by mobile devices and with the knowledge mediated by them. Increasingly, they will feel less inhibited and less intimidated by knowledge and technology since they will form a greater part of their everyday lives, under their control and not the prerogatives of affluent students from more entitled social classes.

This is obvious in relation to technology but less so in relation to knowledge. In the case of the technology, the increasing capacity, capability and functionality of mobile devices means that activities associated with landline telephones, analogue cameras, desktop computers, television sets and music centres are now all converging on devices that have become as commonplace, personal and taken-for-granted as the wristwatch and the cigarette lighter. This has taken place over about 10 years. The impact of this on students' attitudes to technology, especially to computer technology and digital technology, must be profound, although of course very different for different age groups and hence different for mass-participation universities as opposed to traditional universities.

In the case of knowledge, and of course in the case of information, images and content in general, this is also true, but we must distinguish between the consumption of knowledge and its production.

Mobile devices, especially connected devices, enable students to consume – that is, to access and store – all sorts of knowledge almost instantly and almost wherever they are, with little or no effort compared with earlier technologies. Now practically all types of information are easily accessible on mobile phones. Podcasts of academic courses are available from the world's universities. This shifts the educational locus and authority away from face-to-face provision and delivery, and away from formal educational institutions. Student devices are an integral part of these processes.

The changed sense of the ownership of technology and knowledge, just described, has practical implications for the actual ownership of technology and knowledge within education itself. We come to these later.

In addition to the changing ownership of knowledge, mobile devices deliver this knowledge chunked, structured and connected in very different ways from earlier learning technologies such as the lecture, the web and the book. Knowledge is not abstract, unaffected by how it is stored, transmitted or consumed. In its earliest forms, knowledge and learning came from lectures, a linear format from an authoritative 'sage-on-the-stage' with no pause, fast forward or rewind, and from books, substantial and linear but segmented and randomly accessed. The delivery of knowledge and learning by networked computers meant a break from linearity with the

introduction of hyperlinks and new heuristics of usability that prescribed how knowledge and learning should be chunked and presented. With mobile technologies, using a small screen and a limited input medium, the usable chunks become much smaller but the navigational overheads become much larger. In essence, small pieces of knowledge and learning can be easily presented but their relationship to any others may be difficult to understand, thereby fragmenting and perhaps trivialising what students learn.

The patterns of use – that is, the various ways in which people interact with technologies – also differ dramatically if we compare sedentary desktop technologies with mobile personal technologies. The use of desktop computers, documented in the research literature of human–computer interaction, is well understood, well established and much more tractable than is the use of mobile devices (see Jones and Marsden 2006). Our understanding of how people engage with information as they walk down the street and perhaps share devices with friends is still relatively limited. Words such as “lightweight”, “opportunistic”, “informal”, “spontaneous”, “episodic”, “private” and “personalised” are found in the literature but this is often impressionistic. Nevertheless, creators, publishers and providers of content (and navigation and organisation) must adapt to these findings as they emerge if the student experience is to be optimal.

Mobile technologies have converged with the wider user-generated content movement associated with Web 2.0 rhetoric and technologies, promoting the Web as a medium for writing and participation not just for reading and passivity. It uses technologies such as wikis, mashups, blogs, newsfeeds and podcasts to move the web from a centralised broadcast medium to one where everyone has a voice. Mobile devices extend and enhance this voice because they allow users to capture content – for example, images, sounds, data and voices themselves – from the real world, from events as they happen, specific to when and where they happen. The rise of citizen journalism (for an account and analysis, see Ananny and Strohecker 2002) is a very specific example of the power of mobile phones and user-generated content. Meanwhile, previously unknown musicians and disenfranchised political groups use the same technologies to propagate their material and their views. In doing so they create a more fragmented and complex world where the received wisdom and the accepted tastes no longer have the hegemony or the authority that they had in more static, stable times.

Mobile students are now able to create, access and publish not only facts about the outside world but the inside world too, information about themselves, their friends and affiliations, their feelings, their days and their doings. Every mobile phone has personal information management software – that is, calendars, tasks, notes, contacts, and so forth – that can be made visible to the chosen few or the unchosen many. Now social network software on mobile phones can capture and distribute content that is less purely functional and much more intimate. The wider visibility of this personal information is part of the transformation of identity and students’ sense of themselves and their communities, no longer based in the purely physical and the face to face.

Dramatically increased levels of individual choice, control and convenience sound benign; however, there are drawbacks. These developments reinforce a tendency to view knowledge and other forms of content merely as commodities or assets; furthermore, this choice and control are exercised at a purely personal level, allowing individuals to each pursue their own curiosity, constructing their own private libraries and inhabiting their own worlds of knowledge. This erodes the idea of a commonly

accepted canon, a common curriculum, of things we all need to know and are assumed to know, and replaces it with what some people have referred to as a neo-liberal nightmare – not dream but nightmare.

This will have consequences for the perceptions that students have of their universities. Historically these granted the less well-off access to learning, knowledge and technology but this access has always been constrained. Student devices change all this and challenge the role of the education professions and the educational institutions, progressively demystifying their roles as gatekeepers, custodians and arbiters of technology and knowledge. The impact of student mobile phones on other aspects of student agency and equity has been explored elsewhere (Czerniewicz, Williams, and Brown 2009).

Disruption – nuisance, threat and student devices

Disruption is often used about mobile devices in educational settings (for a typical example, see Sharples 2001) – and in the world of technological innovation too (Bower and Christensen 1995). The exact meanings of the word are not usually unpacked but they have considerably greater significance when we think about student devices rather than institutional devices. There a weak version of disruption that amounts to nuisance; telephone calls in class, texting in examinations, photographs that should not be taken, inappropriate ring-tones, and so on. There is, however, also a strong version of disruption. These devices allow students to access and store images and information of their own choosing and perhaps create and distribute new images and information independently of the lecturers and of the university. The long-term consequence must be to challenge the authority of the curriculum and the institutions of formal learning. At the moment, education is still delivered primarily and knowledge is accessed primarily through formal institutions on institutional premises. The technology to enable this is accessed on institutional premises. This gives institutions enormous power and control over the nature and style of learning that can be accessed, especially by less affluent students with fewer alternatives.

The institutions of formal learning regulate and control access to knowledge, technology and learning for less privileged parts of students: the universities are also the agents of equity and inclusion. Our point here, however, is that student devices confront this stranglehold on learning; the universities and the lecturers are no longer the gatekeepers. Interestingly, Selwyn (2003) uses similar but different sources and analysis to draw a similar picture of the UK schools sector.

Infrastructure, blending, procurement and sustainability

Student devices present a major challenge to many of the institutional practices and procedures associated with ICT and ‘conventional’ desktop e-learning. It is easy to say that education should embrace student devices but not easy to say how. This is part of the paradox. Historically, institutions rather than individuals have taken the responsibility for the provision of the information technology (IT) needed to deliver and administer learning. This can be explained as the benign industrialisation and electrification of learning, necessary to deliver modern mass learning, ensuring quality and uniformity, and mapping standardised curricula onto standardised technologies. All too often, the institutional provision of IT led to a very narrow prescription about the hardware, peripherals, connectivity, operating systems, applications and privileges

that could be accessed by students and lecturers. In the era when the dominant technology was networked desktop PCs this made sense, at least in terms of procurement, installation, support, staff development and user training, and was usually managed through a centralised IT unit.

As more mobile technologies proliferated, this has become a less tenable approach and has been seen as a constraint on personal and professional choice amongst lecturers, and amongst students, rapidly acquiring their own personal technologies and wanting to access institutional learning resources. In technical terms, the diversity and transience of mobile devices are orders of magnitude greater than with desktop technologies; in financial terms, this transience and diversity are insupportable and increasingly seen as unsustainable (UCISA 2009). Experience in early pilots (for example, Traxler and Riordan 2004) suggested that students were not likely to value a second device, an anonymous university-provided device, one that did not express their taste or aspirations and one that it would inevitably be the one left at home.

On the other hand, wholeheartedly adapting an approach centred on student devices is challenging and radical for institutional IT units. Their roles would change drastically, depending on the institution and its mission, and on its finances. Furthermore, university IT units would take the lead in implementing whatever policies are considered necessary for uniformity and equity. This might include issuing vouchers for purchase or hire of devices, for airtime and connectivity (voice, messages, data) as appropriate. It might also include standards and minimum specifications within which student choice and purchase could be managed. Standards and specifications are attractive and it might be possible to promulgate national standards; but even in stable areas of IT, standards do not have a good record because of their proliferation.

Blending, the term used for the integration of different and appropriate technologies in order to deliver and support optimal learning, is another key concern in the acceptance of student devices. How can educational quality be assured when one of the components of delivery is so diverse and volatile? Can student devices only be used for optional or enriching material, or perhaps only with specified categories of students?

The ethics of student devices

There are various ethical aspects to the increasing prevalence of mobile devices in our society and these have an immediate bearing on any consideration of student devices. Ethics covers everything from the legal and regulatory aspects of our actions, utterances and behaviour to informal expectations about etiquette, expectations, protocols and norms. Ethics is a major constituent of culture and identity (because our sense of right and wrong is part of who we are and who we feel comfortable with, and so differs across sub-cultures, generations, social classes and ethnic communities). Many of what we described as the social consequences of mobility have ethical aspects, even something as simple as texting in class or answering a call whilst eating.

Student devices move us away from the simple dichotomies of regulating acceptable use. We used to make a distinction between formal learning activities in our universities on our equipment and self-motivated learning activities outside our institutions not on our equipment. We had a duty to regulate the former and had no mandate to regulate the latter. If we are to embrace student devices, this simple dichotomy breaks down and the boundary becomes blurred. Guaranteeing e-safety becomes more problematic when on the one hand we encourage the use of student devices for

learning but on the other hand have no ability or authority to control how, when or where they are used, nor any control over the applications, data or networks they support. At the very least, policies of acceptable use must evolve rapidly to address the affordances of student devices.

There are other issues. With increasingly sustainable and sensitive contextual information, student devices necessarily can give institutions far greater insights into the locations and behaviour of students. Enriching the educational experience must involve engaging as fully as possible with this contextual information and perhaps linking it to other educational systems such as learning platforms or attendance registers. With this comes the potential for greater surveillance and oversight of students. Concerns about privacy and surveillance may stop some students volunteering their devices. Some students are already saying “not on my phone” because they feel educational material on a personal, social and recreational phone is intrusive (see, for example, recommendations of the MELaS project; Brett 2008).

Other issues are merely the issues of any mobile devices used educationally not just those owned by students. The problems are increased, however, when the boundary between personal and educational becomes blurred.

Conclusions

To return to our starting point of dreams and responsibilities, student devices unlock the dreams of agency, control, ownership and choice amongst students but put the dreams of equity, access and participation at risk. Universities cannot afford, procure, provide nor control these devices but they cannot ignore them either. Clearly such a stark choice is an over-simplification; there is no simple question and no simple answer.

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Note

1. First published in *ALT-C* 2009: 978 0 95 458 709 3 ISBN “*In dreams begins responsibility*” - choice, evidence, and change. Reproduced here, with minor amendments. Copyright of this paper remains vested with the individual authors or their employer and is licensed for use with a Creative Commons “Attribution Non-Commercial-No Derivative Works 2.0 UK: England & Wales licence.”

References

- Ananny, M., and C. Strohecker. 2002. Sustained, open dialogue with Citizen photojournalism. Paper presented at Development by Design Conference, December 1–2, in Bangalore, India.
- Bar, F., P. Francis, and M. Weber. 2007. Mobile technology appropriation in a distant mirror: Baroque infiltration, creolization and cannibalism. Paper presented at Seminario sobre Desarrollo Económico, Desarrollo Social y Comunicaciones Móviles en América Latina, April 20, in Buenos Aires.
- Bower, J.L., and C.M. Christensen. 1995. Disruptive technologies: Catching the wave. *Harvard Business Review* Jan–Feb: 43–53.

- Brett, P. 2008. MELaS mobiles enhancing learning and support final report. JISC. <http://www.jisc.ac.uk/media/documents/programmes/elearninginnovation/melasfinalreport.pdf>.
- Bull, M. 2005. No dead air! The iPod and the culture of mobile listening. *Leisure Studies* 24, no. 4: 343–56.
- Cooper, G. 2002. The mutable mobile: Social theory in the wireless world. In *Wireless world: Social and interactional aspects of the mobile world*, ed. B. Brown, N. Green, and R. Harper, 19–31. London: Springer.
- Czerniewicz, L., K. Williams, and C. Brown. 2009. Students make a plan: Understanding student agency in constraining conditions. *ALT-J, Research in Learning Technology* 17, no. 2: 75–88.
- Des Bordes, A., and S. Ferdi. 2008. Do knowledge and new technologies need a new epistemology? Paper presented at BOBCATSSS 2008 Providing Access to Information for Everyone, January 28–30, in Zadar, Croatia.
- Donner, J. 2008. The rules of beeping: Exchanging messages via intentional ‘missed calls’ on mobile phones. *Journal of Computer-Mediated Communication* 13: 1–22.
- du Gay, P., S. Hall, L. Janes, and K. Nequs. 1997. *Doing cultural studies: The story of the Sony Walkman*. London: Sage.
- Fortunati, L. 2002. The mobile phone: Towards new categories and social relations. *Information, Communication & Society* 5, no. 4: 513–28.
- Gergen, K.J. 1996. Technology and the self: From the essential to the sublime. In *Constructing the self in a mediated age*, ed. D. Grodin and T. Lindlof, 127–40. Beverly Hills, CA: Sage.
- Goffman, E. 1971. *Relations in public*. Harmondsworth: Allen Lane.
- Green, N., R.H.R. Harper, G. Murtagh, and G. Cooper. 2001. Configuring the mobile user: Sociological and industry views. *Personal and Ubiquitous Computing* 5: 146–56.
- Hemmi, A., S. Bayne, and R. Land. 2009. The appropriation and repurposing of social technologies in higher education. *Journal of Computer Assisted Learning* 25: 19–30.
- International Telecommunications Union. 2004. Social and human considerations for a more mobile world. Report from ITU/MIC Workshop on Shaping the Future Mobile Information Society, February 26, in Seoul.
- Jones, M., and G. Marsden. 2006. *Mobile interaction design*. Chichester: John Wiley & Sons.
- Kumar, S. 2004. Mobile communications: Global trends in the 21st century. *International Journal of Mobile Communications* 2, no. 1: 67–86.
- Ling, R. 2004. *The mobile connection – The cell phone’s impact on society*. San Francisco, CA: Morgan Kaufmann Publishers.
- Nyíri, K. 2007. *Mobile studies: Paradigms and perspectives*. Vienna: Passagen Verlag, Hungarian Academy of Sciences.
- Pertierra, R. 2005. Mobile phones, identity and discursive intimacy. *Human Technology* 1, no. 1: 23–44.
- Plant, S. 2002. *On the mobile – The effects of mobile telephones on individual and social life*. Motorola. <http://www.motorola.com/mot/documents/0,1028,333,00.pdf>.
- Prensky, M. 2001. Digital natives, digital immigrants, Part 1. *On the Horizon, NCB University Press* 9, no. 5: 1–6.
- Rettie, R. 2005. Presence and embodiment in mobile phone communication. *Psychology Journal* 3, no. 1: 16–34.
- Rheingold, H. 2002. *Smart mobs – The next social revolution*. Cambridge, MA: Persius.
- Rolt, L.T.C. 1947. *High horse riderless*. Bideford: Green Books.
- Satyanarayanan, M. 2001. Pervasive computing: Vision and challenges. *Personal Communications of IEEE* 8, no. 4: 10–17.
- Selwyn, N. 2003. Schooling the mobile generation: The future for schools in the mobile-networked society. *British Journal of Sociology of Education* 24, no. 2: 131–44.
- Selwyn, N. 2009. The digital native – Myth and reality. *Aslib Proceedings: New Information Perspectives* 61, no. 4: 16.
- Sharples, M. 2001. Disruptive devices: Mobile technology for conversational learning. *International Journal of Continuing Engineering Education and Lifelong Learning* 12, nos 5–6: 504–20.
- Sheller, M. 2004. Mobile publics: Beyond the network perspective. *Environment and Planning D: Society and Space* 22: 39–52.

- Shortis, T. 2009. Revoicing TXT – Spelling, vernacular orthography, and ‘unregimented writing’. In *Connected minds, emerging cultures – Cybercultures in online learning*, ed. S. Wheeler. Greenwich, CT: Information Age Publishers.
- Sørensen, C., L. Mathiassen, and M. Kakiara. 2002. Mobile services: Functional diversity and overload. Paper presented at New Perspectives on 21st-Century Communications, May 24–25, in Budapest, Hungary.
- Thurlow, C. 2003. Generation Txt? The sociolinguistics of young people’s text-messaging. *Discourse Analysis Online* 1, no. 3.
- Traxler, J., and B. Riordan. 2004. Using PDAs to support computing students. Paper presented at LTSN Annual Conference, September, in Belfast, Northern Ireland.
- Trinder, J. 2005. Mobile technologies and systems. In *Mobile learning: A handbook for educators and trainers*, ed. A. Kukulska-Hulme and J. Traxler, 7–24. London: Routledge.
- UCISA. 2009. UCISA’s top concerns 2008–9. UCSISA. http://www.ucisa.ac.uk/members/surveys/tc/tc2008-9/top_ten.aspx.
- Wiess, A. 2007. Cloud computing: PC functions move onto the web. *netWorker* 11, no. 4: 16–25.