

# **Learners – Should We Leave Them To Their Own Devices?**

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## About the author

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He is a director of the International Association for Mobile Learning, Associate Editor of the International Journal of Mobile and Blended Learning, and Conference Chair of mLearn 2008, the world's biggest and oldest mobile learning research conference. John has co-written a guide to mobile learning in developing countries and is co-editor of the definitive book on mobile learning: Kukulska-Hulme, A and Traxler, J (2005), *Mobile Learning: A Handbook for Educators and Trainers*, Routledge.

In addition, John has written more than 10 book chapters and publishes regularly on evaluating and embedding mobile learning, and is interested in the profound consequences of universal mobile devices on our societies.

He is jointly responsible for national workshops on mobile learning for UK universities, and has delivered similar workshops to university staff in Germany, Kenya, South Africa, Canada and India. He advises UK universities on mobile learning projects, for example, in large-scale messaging, podcasting and broadcasting with Bluetooth.

He advises the Swiss BioVision Foundation on appropriate technologies to support Kenyan farmers and continues to work with the Kenyan Government, implementing national support for teachers' in-service training using mobile phones and video. He has links with Avallain AG, one of Europe's leading e-learning system developers. He was the evaluator for the EU FP6 m-learning project.

## Introduction

In the last five or six years, mobile devices have been used again and again to enrich learning and to extend its reach. In general, however, we have not seen progress to large-scale and long-term deployment because of the resource implications. This article explores a radical solution to this impasse.

Mobile devices include smartphones, games consoles, media players, netbooks and handheld computers. Almost everyone owns one and uses one, often more than one. They also invest considerable time, effort and resource choosing them, buying them, customising them and exploiting them. These devices express part or much of their owners' values, affiliations, identity and individuality. They are both pervasive and ubiquitous, both conspicuous and unobtrusive, both noteworthy and taken for granted in the lives of most of the people in this country.

This is new and is completely different from older, static and less personal information technologies such as desktop computers and TVs. It is a quantitatively different phenomenon and the statistics are commonplace: MP3 downloads outnumber CD sales, camera phones outnumber cameras, smartphones outnumber laptops, mobile phone ownership is reaching saturation and the British send over a billion text messages a week.

Mobile devices are, however, also a qualitatively different phenomenon. People no longer need to engage with information and discussion at the expense of 'real life'. They can do so as part of real life, as they move about the world, using their own devices to connect them to the people and ideas of their own choosing, perhaps using their own devices to generate and produce content and conversation as well as store and consume them. This is changing how people relate to technology. It is also changing how they relate to other people and to the content and conversation facilitated by the technology.

This article looks at these devices, in the hands of so many learners, and the challenges and opportunities that they represent for the support and provision of learning, and indeed for the meaning and nature of learning. We use the phrase 'learner devices' to signify not mobile devices in general, nor their purely technological characteristics, nor those mobile devices that might be especially suited to learning or already used in education; we use the phrase emphatically to explore the educational implications of learners' choices. Much of the discussion will seem to focus on mobile phones. This is understandable considering the massive dominance in people's lives of mobile phones over other mobile technologies. The increasing functionality and power of the mobile phones that people buy mean, however, that very few mobile technologies are not coming into the hands of most mobile phone owners and thus into the hands of most people. Of course, a much wider range of mobile devices is in circulation but we must remember the

demographics of all these devices and acknowledge the primacy of the mobile phone among the less privileged. We should also recognise that to portray the demography of ICT access as simply ‘digital immigrants’ and ‘digital natives’ (Prensky 2001) is to over-simplify a situation where different technologies are adopted by different communities, cultures and subcultures in different ways and at different rates.

Some of this thinking is reflected in Becta’s strategy, *Harnessing Technology: Next Generation Learning*, and in the words of Bill Rammell MP, talking to the Association of Colleges on 25 June 2008 as minister of state for further and higher education and lifelong skills, when he described: ‘...a world without barriers. Where learners expect their own technology to interface with yours.’

The technologies and devices themselves are important in this, as are the systems, networks and infrastructures that support them. The trends in functionality, availability, ownership and use are also important, as is the operation of the marketplace – that is, the networks, the content providers, the service providers and the hardware manufacturers – in determining what gets promoted and what gets ignored.

These are all factors that put devices in the hands of learners, and constrain and position their use. At that point, other factors come into play. These factors are part of an evolving dynamic between technology on the one hand, and society (including education) on the other, as people, communities and institutions adapt and evolve around the technology. The particular significance of widespread mobile devices in this respect is their impact on ideas about information and knowledge, and about the nature, support and delivery of learning, and how these will evolve.

This article explores all these issues and looks at the challenges – from the practical to the philosophical – that education faces if schools, colleges and universities are to move in a direction that is aligned to this dramatic rise in learners’ own devices. Obviously, education is not monolithic. Schools, for example, have a rather more explicit and comprehensive duty of care than universities, while the voluntary sector, the adult and community learning activists and work-based learning practitioners, among others, might find a discussion of learner devices much more familiar and comfortable, both philosophically and practically, than formal educational institutions.

In *Emerging Technologies for Learning (Volume 3)*, Becta’s chief executive Stephen Crowne writes: ‘Looking across the three volumes, as well as exploring a range of technologies, important themes are emerging. For example, the adoption of technology in society is genuinely influencing expectations about where and how learning takes place. Educators will increasingly need to understand what these trends really mean and how to respond to related demand from learners. It will become increasingly important to understand how new technologies can enable rich,

social, personalised and contextually-based interactions to support learning.’ This is exactly what this article explores.

Any reader specifically interested in exploring mobile learning in general, as distinct from learning with learner devices, should see the bibliography.

## Trends in technology, ownership, access and use

If we look at mobile devices and technologies, especially if we make a comparison with desktop PC devices and technologies, what we see is diversity, transience and incoherence. Mobile devices come in all sorts of shapes and sizes, with all sorts of keyboards and screens, running various operating systems, applications, networks and connectivity, any of which will change overnight, even those as supposedly stable and standard as Java Mobile Edition.

There is no standard footprint or format. They may open out, slide open or not open at all, with a real keyboard, a virtual keyboard or may respond to touch, gesture or stylus. They capture or play various media and connect to various networks and devices. See, for example, Trinder (2005) for principles or check out <http://news.bbc.co.uk/1/hi/technology/default.stm> regularly for specifics. New mobile technologies are coming to maturity and perhaps coming to market. These include flexible screens, virtual keyboards, full internet access, pico (microscopic) technologies, mobile social software, location awareness, haptic interfaces, wearable devices, voice activation, multiplayer gaming and mobile TV, and behind them, enhanced forms of service, connectivity and data.

The issue is, though, how technology is packaged, presented and marketed. Given current trends, it seems inevitable if there is a business case for these or any other features, then they will be marketed around mobile phones, though more features will also go into media players and into games consoles.

Many exponents of mobile learning hoped or expected that some generic 'converged' mobile device would eventually emerge. This would be a general-purpose smartphone/PDA. Until this device emerged, projects would use existing devices as proxies merely to gain some experience and make some progress. If we look at mobile devices in practice, we see this is unlikely to happen and that this has major implications for our understanding of learner devices.

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 co-opting mobile devices intended for individual lifestyle customers. Not one of these technologies was intended for educational use and so they continually challenge educationalists to develop educationally sound applications; they do, nonetheless, have 'real world' credibility in the eyes of learners and perhaps this is in their favour.

While we are comparing desktop technologies with mobile technologies, we should also remember that any comparison of the economic environment of the two technologies, including education, is dramatically different. The networks are very big

players when it comes to mobile technologies and most device manufacturers would not have a sustainable market without them (as they discovered when they used to build and sell stand-alone PDAs). This is a major factor in the consumer choice of learner devices through the operation of the various tariffs, contracts and models on offer.

There are underlying differences with desktop PCs. The design and manufacture of mobile devices produces a closed box. Unlike PCs, manufacturers cannot adapt to evolving markets by putting in extra cards for graphics processing, increased memory, enhanced connectivity or games functions, and cannot easily plug in extra or improved peripherals such as better screens, joysticks or concept keyboards. This inflexibility means manufacturers are conservative and target discrete niches in the market. Images or accounts of the inside of any mobile phone clearly illustrate that mobile devices are not designed to be upgraded (except, sometimes, the firmware), serviced or even opened, just used and discarded. Compare this with the number of magazines devoted to home PC maintenance and the amount of software that the home PC user can access and install!

## **The economic consequences of trends**

These trends, both those of increasing functionality and those of increasing ownership, are having an impact on society. There is a growing literature looking at the economic, social, cultural and psychological aspects of this impact. It is relevant here because learner devices are the interface and the front line between these aspects across our communities and the more structured formal institutions of education.

The economic aspects of these trends are twofold. First, the shifts in the nature of economic activity – that is, in the jobs people do, the products and services they supply, the assets and resources they invest and the businesses they work for – as mobile systems become more and more central to economies across the world.

Second, the nature of work itself, the times and places of work and the relationships within work are all changing. The improved connectivity between a mobile workforce and its headquarters means greater efficiency since peripatetic workers can be deployed and supported at a distance, but also a greater burden on workers who can connect at any time and place, weakening the home/work boundaries as people work while they commute.

One obvious implication, insofar as learning is understood as a type of work, is that expectations about where, when and how learning happens will change. Learning is also an explicit preparation for work and the economy and so expectations about the content of learning must also change. Fortunately, learning is not always understood

as work and there is research evidence for the considerable amount of learning that is self-motivated, informal or serendipitous (Vavoula 2004).

Another obvious implication, insofar as learning is understood as a preparation for work and the world of work, is that the content and style of education must continually keep pace with the economic aspects of these changes.

## **The social consequences of trends**

The personal, cultural and social aspects of these trends hinge 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 learner has their back to the rest of world for a substantial and probably premeditated episode. Interacting with mobile technologies is different and woven into all the times and places of users' and learners' lives. Mobile phones have created 'simultaneity of place' (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'. This affects people's sense of time, space, place and location, their affiliations and loyalties to groups and communities, the ways in which they relate to other individuals and to groups, their sense of identity, and their ethics, that is, their sense of what is right, what is wrong, what is approved of and what is not.

Therefore, when we say we can ignore desktop technologies but not mobile technologies, we mean that desktop technologies operate in their own little world, while mobile technologies operate in *the* world.

Researchers remark that '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), that 'massive changes are occurring in the nature of both public and private life and especially of the relations between them' (Sheller and Urry 2003), and that '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). Ironically, of course, many mobile phone conversations start: 'I'm on a train...' So much for the demolition of distance! We are still adjusting.

Researchers also comment on the use of mobile devices, often phones but more usually media players such as the iPod, to take back public space or work time back into the private; with a mobile device, there is 'no more dead air' (Bull 2005).



Mobile technologies are redefining discussion and conversation. Rather than these being set aside as something one does at certain moments, for a delimited stretch of time, usually in a private space (or semi-private 'box' or 'booth'), there is now 'a constant flickering of conversation' (Sheller 2004). Furthermore, in order to manage the intrusions of online calls and conversations into real time and space (or vice versa perhaps), we are evolving 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, for example, devising new 'tie signs' (Goffman 1971) in order to manage simultaneous conversations in real and virtual space, allowing us to service different conversations without offending either our real correspondents or our virtual ones.

Mobile devices are eroding established notions of time as the common structure for scheduling, co-ordinating and organising activities and events. Researchers talk about the 'approx-meeting' and the 'multi-meeting' (Plant 2000), about 'socially negotiated time' (Sørensen et al 2002) and the 'micro co-ordination of everyday life' alongside the 'softening of schedules' (Ling 2004) afforded by mobile devices as we use them to adjust our schedules and our commitments 'on the fly'. Another researcher says: '...with the mobile phone, time has become personalised.'

Mobile devices are also eroding physical place as a predominant attribute of space. The phrase 'absent presence' (Gergen 2002) describes situations where groups of people physically together, co-located, 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 school, 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 such as Facebook have adapted and migrated to mobile devices; in other cases, social networking sites native to mobile devices, such as Twitter, have developed and flourished.

Sometimes the device itself, the early Walkman (du Gay et al 1997) and the first cellphones, for example, signifies membership of a group or community. In other cases, specific groups or communities use the devices in their own exclusive way. With each of these groupings comes new norms, expectations, ethics and etiquettes, and shifting ideas about 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 with. Increasingly, online social networks are part of this identity construction and these are becoming mobile, reintegrating the virtual and the actual.

At the mLearn 2007 conference in Melbourne, 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 learner devices, we must recognise how closely they are bound up with a changing sense of self: '...the cellphone helps to stay permanently within the closed social field of familiar others, thus reinforcing a unified, coherent individual identity' (Geser 2004). Perhaps this is saying that mobile devices facilitate not so much the collision of our real and our virtual worlds as their integration.

## **The educational implications**

We can tease out some of the implications for education at a number of levels. There is a purely tactical level: education and its institutions are fundamentally sound but need to tinker with, perhaps, timetabling, network security, staff development, assessment regimes, the wording of acceptable-use policies or the constituents of blended learning and all will be well.

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 education. These transient and mobile communities have their own norms and might govern etiquette, language, values and ethics, and educators must understand these in order to work effectively within these communities.

Services, connections, discussion and content – and education is all of these – are no longer seen as dependent on face-to-face contact at predetermined times. Educational provision is traditionally built around time and place: the timetable, deadlines, hand-in dates, the year group, the classroom and the laboratory. These observations suggest that the education system, especially the formal education system, is getting out of step with how many people understand the world they live in and that, irrespective of the significance and reaction to learner devices, changes are needed to keep education aligned to a changed and mobile society. These factors taken together are significant to learning and education, and to how the education system tackles the challenge of learner devices, because they reveal how central these devices and technologies are to the lives of almost everyone in our society.

We should say that learner devices have clear implications for the rapidly developing discipline of mobile learning, for example, context-aware learning or the connected classroom. We could explore these implications but the issue here is whether mobile learning would be intrinsically different if learner devices rather than institutional devices were used. There are obviously extrinsic differences, for example, in sustainability or scalability, but are there intrinsic differences? This is difficult to generalise about; there might be little difference in learning in the connected classroom but big differences in context-aware informal learning.

## **Ownership of technology, knowledge and learning**

These changes will cause significant shifts in the idea of the ‘ownership’ of technology, knowledge and learning. We obviously mean here that more people and a greater range of people will buy and possess mobile devices and access information. We also mean, however, that through this process, these people 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.

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, TV sets and music centres are now all converging on devices that have become as commonplace, personal and taken for granted as spectacles or wristwatches. This has taken place over about 10 years. The impact on people’s attitudes to technology, especially to computer technology and digital technology, must be profound, though of course very different for different age groups. The facts that mobile phones are reported on headline news, advertised on prime-time TV and sold through more and more diverse retail outlets, including supermarkets, filling stations and newsagents, shows the level of popular acceptance and interest.

In the case of knowledge, and thus in the case of information and content in general, this is also true. We need, however, to distinguish between the consumption and production of knowledge.

Mobile devices, especially networked or connected devices, enable people to consume (that is, to access and store) all sorts of knowledge almost instantly and almost wherever they are, with little or no overhead or effort compared to earlier technologies. Even before the current generation of mobile phones providing pure web access, earlier generations of many mobile phones had provided reversioned web material. Now practically all types of information, files and formats, available from Wikipedia, Google Scholar, Flickr, iTunes, YouTube, Facebook, Google Maps, BBC iPlayer and from elsewhere, are easily accessible on many mobile phones, at least technically if not always affordably. Podcasts of academic courses are available from some of the world’s greatest universities including the Open University and MIT. Apart from anything else, this shifts the educational locus and authority away from face-to-face provision and delivery, and away from formal educational institutions. Learner devices are an integral part of these processes.

In addition to the changing sense of the ownership of knowledge consumption, 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 substantial linear format from an authoritative 'sage on the stage' with no facility to pause or rewind, and from books, also authoritative, 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. This was accompanied by the rise of the 'guide by your side'. With mobile technologies, using a small screen and a limited input medium, the usable chunks become much smaller but the navigational overheads become much, much larger. In essence, small pieces of knowledge and learning can be presented easily but their relationship to anything else may be difficult to understand, fragmenting and perhaps trivialising what people 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 is well understood, well established and much more tractable than is the use of mobile devices. 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 like 'lightweight', 'opportunistic', 'informal', 'spontaneous', 'episodic', 'private' and 'personalised' are used, but this is often impressionistic or anecdotal. Nevertheless, creators, publishers and providers of content must adapt to these findings if users' experiences are to be optimal. As the content evolves so will the expectations of users and this will change how we exploit learner devices.

The most helpful analogy is likely to be the wristwatch – with no overhead, no thinking, no hesitation – not the desktop PC. This expectation may, however, further fragment and trivialise interaction and engagement with learning, even if it increases its specificity in terms of context and locality.

Moving from the consumption of knowledge to its production, the increased functionality of mobile devices is hastening the convergence of mobile technologies with the wider 'user-generated' content movement and Web 2.0 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 themselves – for example, images, sounds, data and voices – from the *real* world, from events as they happen, specific to when and where they happen. The rise of 'citizen journalism' is a specific example of the power of mobile phones and user-generated content; people with mobile phones can generate, transmit and broadcast news without the interference, intervention or

control of any centralised agency or organisation. Journalism is apparently the first draft of history.

Another factor at work in transforming mobile content rather than merely porting it from desktop formats will be the evolution of business models based around mobile devices. Since the advent of networked computers, publishing has been in turmoil as the traditional print-based publishers faced the growing competition of entertainment and news media giants, digital content providers and the global software industry. As mobile devices become more connected and more powerful, they represent an increasingly attractive publishing opportunity for these various players. However, the mobile phone networks are new and extremely powerful competitors and perhaps the only ones with a viable business model. Content available for mobile devices, and hence for learner devices, will depend on how exactly what business model emerges and what alliances the various players devise.

Much of this account of the consumption of knowledge sounds benign, for example, the dramatically increased levels of individual choice, control and convenience. There are, however, some drawbacks. The first is that these developments reinforce a tendency to view knowledge and other forms of content merely as commodities or assets – perhaps learning object technologies represent a similar perspective. The second is that 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.

## **Nuisance and new knowledge**

This will have consequences for the perceptions that learners have of their various institutions of learning. Historically, these institutions granted the less well-off access to learning, knowledge and technology but this access has always been constrained by lecturers, teachers, employers, librarians and caretakers, by exam boards, by opening hours, by preferred suppliers and by acceptable URLs. Mobile devices, particularly learner 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, causing 'disruption'. This is not to ignore their role as guides or intermediaries, nor is it to ignore their work in nurturing intrinsic motivation and providing extrinsic motivation, merely to place them all in a more complex context.

There are exceptions to this generalisation – adult and community learning, for example – and while we argue that the institutions of formal learning regulate and control access to knowledge, technology and learning for less privileged parts of societies, they are also the agents of equity and inclusion. My point here, though, is

that learner devices confront this stranglehold on learning; the institutions and the professionals are no longer the gatekeepers.

## **Infrastructure, blending, procurement and sustainability**

Learner devices also represent a major challenge to many of the institutional practices and procedures associated with ICT and desktop e-learning. It is easy to say that education should embrace learner devices but not easy to say how. Traditionally, institutions rather than individuals have taken the responsibility for the provision of the 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. All too often, the institutional provision of IT has led to very narrow prescriptions about the hardware, peripherals, connectivity, operating systems, applications and privileges that could be accessed by learners and teachers and usually, for example, precluded Apple computers or Open Source software. In the era when the dominant technology was networked desktop PCs managed through a centralised IT department or unit, this made sense in terms of procurement, installation, support, staff development and user training.

As more mobile technologies proliferated, this became a less tenable approach and has been seen as a constraint on personal and professional choice among teachers and lecturers, who might want to use iPods for their teaching and Skype, PDAs, BlackBerrys and netbooks for admin and curriculum development, and among learners, rapidly acquiring their own personal technologies and wanting to access institutional learning resources.

When confronted with the possibilities of mobile learning, these difficulties increase. 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 institutional mobile devices represent an extra and ongoing cost. Experience in early pilots (Traxler and Riordan 2003) suggested that university students were not likely to value a second device, a university-provided device, that did not express their taste or aspirations and that it would inevitably be the one left at home. Schools may be different but in general these are the reasons why providing learners with devices is problematic.

The alternative to institutional devices is learner devices and adopting an approach centred on these is challenging and radical for institutional IT service departments, whose roles would change drastically, and might include:

- training and updating teachers and lecturers on the whole range of learner devices, interfaces, content and applications
- advising teachers and lecturers on the choice, purchase and use of their own devices



- revising and reversioning local and external content for all devices
- ensuring all learners have connectivity and security, ensuring equity and access for all learners
- evaluating and preparing for new devices, interfaces, contents and applications
- configuring learner devices, installing applications and training learners
- liaising with libraries and publishers over licences and Internet Protocol
- liaising with local suppliers and vendors to ensure suitable choices for learners
- ensuring back-up, power supplies and synchronisation for learner devices
- installing, configuring and supporting standard software such as office, browser, PIM and messaging applications
- exploiting freeware and popular applications such as games
- monitoring traffic and content, enforcing acceptable-use policy and ensuring learner safety.

This is a radical shift from uniformity to diversity, from stability to impermanence, from a technical focus to a learner focus. Furthermore, institutional IT service departments would have to take the lead in implementing whatever policies were considered necessary for 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 learner choice and purchase could be managed and this might mean some constraints on unbridled learner choice.

Looked at from a different perspective, it might produce more agile and efficient institutions. Many institutions in looking at issues of IT procurement, deployment and development try to take a systemic and holistic view and avoid making piecemeal changes to specific parts of the system. As IT becomes more powerful and functional, this laudable approach becomes problematic; the remit of IT across the institution becomes more comprehensive and interlocking and change in one part of the system is slowed down by the need to analyse the consequences for all the other parts of the system. Passing control and ownership of much of this IT back to the learners would dramatically reduce the system boundary and the gridlock of interlocking parts that currently slows down change.

Blending – that is, the integration of different and appropriate technologies in order to deliver and support optimal learning – is another key concern when we think about acceptance of learner devices. How can educational quality be assured when one of the components of delivery is so diverse and volatile? Can learner devices only be used for optional or enriching material, or perhaps only with specified categories of learners? One way of exploring the potential of learner devices would be pilots with

the more promising cohorts – ‘quick, easy wins’ in the struggle to understand the implications of the learner device perspective.

## **The ethics of learner devices**

There are ethical aspects to the prevalence of mobile devices in our society and these have an immediate bearing of any consideration of learner devices. Ethics covers everything from the legal and regulatory aspects of our actions, utterances and behaviour, to informal expectations about etiquette, protocols and norms. Ethics is also 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 subcultures, generations, social classes and ethnic communities). Many of the social consequences of mobility have ethical aspects, even something as simple as texting in class or answering a call while eating. Our concern here is specifically learner devices, not mobile devices generally.

These devices mean that we are moving away from the simple dichotomies of regulating acceptable use. At the risk of over-simplifying, we used to make a distinction between activities *in* our institutions *on* our equipment and 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 learner devices, this simple dichotomy breaks down and the boundary becomes blurred. Guaranteeing e-safety becomes more problematic if on the one hand we encourage the use of learner 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.

There are, of course, other issues. With increasingly sustainable and sensitive contextual information, learner devices necessarily give institutions far greater insights into the locations and behaviour of learners. Enriching the educational experience must involve engaging as fully as possible with this contextual information and perhaps linking it to other education systems such as learning platforms or school registers. With this, however, comes the potential for greater surveillance and oversight of learners. The implications differ across the sectors; surveillance may even be a good thing for schools responsible for the care of minors but only so long as the data remains secure. Conversely, concerns about privacy and surveillance may stop some learners volunteering their devices. Some learners are already feel educational material on a personal, social and recreational phone is intrusive and not their responsibility.

As before, other issues of learner devices are merely the issues of any mobile devices used educationally not just those owned by learners, but the problems are increased when the boundary between personal and educational becomes blurred.



## **Equity and personalisation**

There is a relationship between lifelong learning and learner devices; the underlying technology prerequisites for realistic lifelong learning are persistence and continuity. Records of achievements, e-portfolios, email accounts and file stores across school, college and employment transitions are technical aspects of lifelong learning. As the public own and use more powerful devices, the argument for exploiting them in the interests of lifelong learning becomes more compelling. This is also the argument for the educational exploitation of 'cloud' computing. This is perhaps a merely pragmatic argument but does nevertheless take us back again to issues of support, ownership and control.

It also opens up intriguing possibilities as learner devices bring new functionality and synergy to the technology of lifelong learning, possibilities hitherto inaccessible or inappropriate. One obvious example is context awareness – learner devices would open up all sorts of possibilities for long-term profiling and tracking, for using sustained social and pedagogic context to improve and enrich lifelong learning. This kind of enhanced personalisation and personalised learning parallels the ideas of 'mass customisation' and the 'long tail'. Computing, especially Web 1.0 and hugely popular desktop applications, have reached very big but largely undifferentiated markets but missed smaller and more diverse markets. Web 2.0 is now at the point of reaching into the 'long tail' and reconciling mass markets with customisation, hence 'mass customisation'.

## **Assistivity, inclusion and diversity**

Many of the previous remarks about learner devices – for example, those about ownership, identity and personalisation – seem to make the case for learner devices as an expression of consumer choice and learner preference and thus put learner devices in a positive or benign light. There are several areas, however, where an unqualified acceptance of learner devices – an acceptance that would imply schools, colleges and universities support whatever devices are preferred and owned by learners – is problematic. Beyond the many technical issues, one of these areas is equity or fairness, ensuring equality of opportunity and access. If institutions are to embrace learner devices, there must be provision for everyone to have the same kind of provision. This means not just devices for everyone, but everyone owning the device they choose. Anything less than this creates divisions and hierarchies but needs complex resourcing, since learner devices are not merely hardware devices but also involve connectivity and airtime and by definition cross the border between personal and educational use, and as we have said, pose serious challenges in terms of teacher training and IT support.

## **Quality, training and content for learner devices**

Other areas where the unconstrained operation of learner choice is hugely problematic include quality assurance and staff training. In both these areas, we have to recognise that the problem does not just lie between learners with their devices on the one hand, and technology support and infrastructure on the other. There is also the educational component, mediated by teachers and lecturers. Currently, there are many small-scale pilots and projects using mobile devices to deliver or support learning. These are taking place in every sector (and in many countries). With the exception of those using SMS messages, Bluetooth connectivity or podcasts, they all depend on learners being provided with devices. These pilots and projects are exploring mobile learning. From a methodological perspective, this is easier with a homogeneous and predictable technology platform. It is easier from a staffing and infrastructure perspective too, since planning and training are comparatively straightforward. It does, however, mean that most of these pilots and projects are unsustainable because they are predicated on finance being available to provide subsequent cohorts of learners with devices. Working with learner devices solves this problem but faces staff developers with the enormous challenge of preparing teachers and lecturers to work with a vast and changing range of devices, of preparing content and lessons for all these devices, and of ensuring the ongoing quality and fitness-for-purpose of courses, programmes and classes. This is a considerable challenge and a major paradigm shift.

## Summary

Learner devices are ‘disruptive’. They are certainly a nuisance but their real significance is as the most obvious manifestation of the ongoing challenge to the education system from social and technical change. The nature of this challenge is, as ever, ‘irrelevance or revolution’; the education system must recognise that learner devices are the technical component of a wider change in society and must consequently reconsider its attitudes and policies in order to continue to serve society.

What are the choices? What are the options? How should the education system and its institutions react?

There is a ‘business-as-usual’ option, involving schools, colleges and universities each deciding that some mobile technologies could enhance their existing provision, and then procuring, deploying and maintaining them in much the same way as they already do for laptop and desktop technologies. My earlier remarks have suggested the need to explore where this option would eventually lead and why it might lead institutions into untenable or unsustainable positions. The ultra-mobile PC (UMPC) format, for example, might, in the purely functional and economic senses, offer institutions the chance to roll out their existing model of procurement, support and control with mobile devices. We should, however, be cautious. This is one more merely tactical solution and neglects the issues of learner ownership, individuality, preference and choice.

Other options would all, in some way, recognise learner choice and irrationality, as well as technological diversity and transience, and might involve a move from a culture of technology provision to one of technology support. More research is needed to explore how full acceptance and, indeed, encouragement of learner devices could work out in practice, and how they would impact on wider relationships between society and education. It is no small challenge and there are no easy answers.

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