**McEwan, T. (2010) Digitally Enabled, ITNow, Nov 2010 edn.**

Below is the supplied copy for the article which appeared in the November 2010 issue. Below that is the first draft – the article was going to be co-authored but the second author had to drop out.

Pre-press was not supplied for checking and there was at least one typo introduced during the editing stage (p9 – adding a bracketed explanation of eWiC), but the shortcomings in terms of flow and structure are the result of not having time to refine further.

It’s worth noting, for colleagues’ benefit, that magazines such as ITNow are driven by journalistic traditions when it comes to deadlines and to sub-editing. However the impact of reaching more than 70,000 members in a glossy format is considerable, and the author will do well to design cycles of authoring and revision to keep to the deadline!

**Mobile: User-centred innovation**

Over the last twenty years we’ve learned that successful innovation in mobile technology depends on understanding people. Failure to understand the user, their activities – their goals and objectives – and the environment in which they use the technology (the “context”), results in gimmick technology that doesn’t leap Geoffrey Moore’s chasm into mass acceptance. The jury is out, for example, on whether the highly fashionable iPhone will make the leap into the mass market (especially for left-handers!). It’s worth noting that, say, Nokia is a much bigger company than Apple, and sells many more phones, and that they and other mobile technology companies do this as much with huge amounts of research into the details of their customers’ lives and aspirations (what the OECD terms “non-R&D innovation”) as technical R&D.

Much of the fruits of both R&D and non-R&D innovation, first emerges at BCS Interaction SG conferences, such as HCI2010  at Dundee Abertay and HCI2011 at the University of Northumbria. 5-10 years ago, at this annual conference, I first saw the tilt, pinch and flick gestures that are now commonplace in commercial mobile products. In sessions and panels, the world’s experts consider how the technically feasible can be turned into socially useful.

At HCI2010, for example, a single 90m session had a paper from Finland on the trend away from paper-based personal information management to using smartphones, one from Australia on a way for the visually impaired to use a smartphone to complete a paper form by hand without needing a sighted assistant, while researchers in Spain, explored the hedonic aspects of mobile technology – a lack of fun in using a device restricts our desire to use it. Each paper is fascinating in its own field but the true delight is in the juxtaposition of these three pieces of research and the fuel they provide for delegates’ imagination to create more useful mobile technology.

This is what BCS conferences are good at – bringing together the related yet different and creating the climate for participants to make links across research silos. Hopefully, by adding, as we do, the papers to EWIC each year, we can help BCS members and the public at large to make these links, even if it will be several years before products come to market. The wide range of specialist knowledge present at a conference – from accessibility to user experience to interaction design to tangential fields like psychology, ergonomics, electronics and healthcare – helps ensure that the eventual products meet the needs of all potential users not just the narrow socioeconomic demographics of the developers.

For example, it’s sometimes difficult for IT professionals and students to fully empathise with the needs of users with impairments. Yet standards such as Draft BS8878:2010 Web Accessibility – Code of Practice, lay out a pretty detailed challenge to developers, to avoid creating IT solutions that disable those with impairments. A consistent message over the last 30 years, from BCS groups such as Assistive Technology, Interaction, and others, has been: what’s good practice for accessibility, is good practice for all users.

Thinking about how we, as individuals, use mobile technology, encourages us  to consider how all interactive media and software can be consumed, when people lack certain modalities, such as sound, vision or touch, due to physical impairment or context or both:

         Can you hear your ringtone, or even feel the phone on vibrate, when walking on a noisy street?

         When you switch on your phone on a sunny day to dial a friend, can you read the screen enough to find the number?

         With your gloves on (or even just with a touch screen) can you successfully dial a number or compose a text message?

         When you’re driving, does the voice-actuated dial work properly?

         When you edit a spreadsheet on your windows mobile, can you see enough on the screen?

         When you’ve been working on a train for a couple of hours without power sockets, are you totally incapacitated when the battery dies?

Since 1992 I have been one of those users, first using HP’s DOS-based clamshells for years at a time before shifting to Palm technology – which seemed to need updating almost annually. Somewhere along the line I added a phone to my bulging pockets and was an early adopter of smartphones. The HP95 was my constant companion for four years,  longer than any mobile device since, and used a pair of AA batteries a week or so. I ran a C-compiler on it, edited in Lotus 123, emailed through a 9600 modem, wrote songs, built up 500 contacts (most of whom remain in my Outlook contacts to this day!), and docked it with a PC every few days. I also treated it to a $400 2MB PCMCIA memory card.

I quickly came face to face with my own physical limitations using it, however. Depending on ambient light, I couldn’t find people’s phone numbers on it, or read where my next appointment was. I have little fingers so I thought the keyboard wasn’t too bad, yet when I look at documents now from back then, they are littered with typos and poorly laid out. There was a search facility that was fast if you knew exactly what you were looking for, but semantic searches were but a twinkle in TBL’s eye.

When the 95 died, I got the beefier HP200LX and that served me well throughout and beyond a fast-moving technology start-up. Since then built-in obsolescence seems to work on multiple levels at once. My current phone contract doesn’t expire for six months but battery life is down to half a day, the main memory constantly runs out of space, and I still can’t phone somebody when I’m outside unless I find some shade!

With mobile, everyone is disabled at some point and in some way. Realising this gives us insights into how those with impairments must cope with the technologies we create. Understanding the causes and consequences of these scenarios and how to cope with them is a good starting point to become a professional developer, one whose solutions and components meet the requirements of legislation, standards and guidelines for accessibility.

 In recent years, researchers, such as the RIAM project in Manchester, have been making the connection between mobile and accessibility in terms of design constraints and guidelines. It would be wrong to see these two sets of needs as identical, but the research is establishing that mobile users without impairments share many of the challenges of desktop users with impairments. Of course mobile users with impairments face the full set of barriers erected by careless developers.

I hate to think how much money I’ve spent and how many hours I’ve wasted trying to get the technology to perform as intended, and coping with the way it intrudes into my life. Despite knowing enough to reconfigure it, mobile technology still doesn’t meet my needs, it disables me at the point of use, and it adds a drag factor to my life, diverting so much time into maintenance.

Mobile devices feature extra technologies and more power – outstripping the IBM PC I developed early multimedia on in the mid-90s, but haven’t really got much better. Any of us becomes disabled when the technology doesn’t match the activity we are trying to carry out in a given context. But for all the downside, this gives us valuable insight. Think about what you feel about the developers in these situations. Now think how people with impairments might feel about the systems you’ve produced.

Tom McEwan FBCS CITP CEng, Edinburgh Napier University

Tom is the Chair of BCS Interaction SG, which runs conferences and workshops for the global human-computer interaction community, as well as an award-winning magazine, Interfaces, a highly-ranked journal, Interacting with Computers, and the leading usability portal usabilitynews.com.

RIAM : see University of Manchester (2008, July 2). Mobile Users Make Same Mistakes As Disabled PC Users. *ScienceDaily*. Retrieved September 17, 2010, from <http://www.sciencedaily.com/releases/2008/07/080701104402.htm>

Excerpt from Global500 2010-09-20http://money.cnn.com/magazines/fortune/global500/2010/full\_list/101\_200.html

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| **Rank** | Company | **$bn t/o** | **$b profit** |
| **115** | [Microsoft](http://money.cnn.com/magazines/fortune/global500/2010/snapshots/3063.html) | **58,437** | **14,569** |
| **120** | [Nokia](http://money.cnn.com/magazines/fortune/global500/2010/snapshots/6652.html) | **56,966** | **1,238** |
| **197** | [Apple](http://money.cnn.com/magazines/fortune/global500/2010/snapshots/670.html) | **36,537** | **5,704** |
| **199** | [Walt Disney](http://money.cnn.com/magazines/fortune/global500/2010/snapshots/2190.html) | **36,149** | **3,307** |
| **200** | [Cisco Systems](http://money.cnn.com/magazines/fortune/global500/2010/snapshots/5009.html) | **36,117** | **6,134** |

# Earlier draft:

## Mobile: insights into disability

It’s sometimes difficult for IT professionals and students to fully empathise with the needs of users with impairments. Yet standards such as Draft BS8878:2010 Web Accessibility – Code of Practice, lay out a pretty detailed challenge to developers, to avoid creating IT solutions that disable those with impairments. A consistent message over the last 30 years, from BCS groups such as Assistive Technology, Interaction, and others, has been: what’s good practice for accessibility, is good practice for all users.

Thinking about how we, as individuals, use mobile technology, encourages us to consider how all interactive media and software can be consumed, when people lack certain modalities, such as sound, vision or touch, due to physical impairment or context or both:

* Can you hear your ringtone, or even feel the phone on vibrate, when walking on a noisy street?
* When you switch on your phone on a sunny day to dial a friend, can you read the screen enough to find the number?
* With your gloves on (or even just with a touch screen) can you successfully dial a number or compose a text message?
* When you’re driving, does the voice-actuated dial work properly?
* When you edit a spreadsheet on your windows mobile, can you see enough on the screen?
* When you’ve been working on a train for a couple of hours without power sockets, are you totally incapacitated when the battery dies?

With mobile, everyone is disabled at some point and in some way. Understanding this and how to cope with these scenarios is a good starting point for become a professional developer, one whose solutions and components meet the requirements of legislation, standards and guidelines for accessibility. In recent years, researchers, such as the RIAM project in Manchester, have been making the connection between design constraints and guidelines for mobile and for accessibility.

The annual conference of BCS Interaction SG each year features research into this area and HCI2010 at Abertay Dundee was no exception. In a single session, delegates heard the following three papers:

* From Finland, Leino et al reported on the trend away from paper-based personal information management to using smartphones (although it’s still pretty much a guy thing which will surprise my iPhone toting wife, veteran of several Palm V models).
* From Australia, Peng et al supplied a way for the visually impaired to use a smartphone to complete a paper form by hand without needing a sighted assistant.
* From Spain, Abad et al investigated the hedonic aspects – a lack of fun in using a device restricts our desire to use it.

Each paper is fascinating in its own field but the true delight is in the juxtaposition of these three pieces of research and the imagination that they fuel for better future mobile technology. This is what BCS conferences are good at – bringing together the related yet different and creating the climate for participants to make links across research silos. Hopefully, by adding the papers to EWIC each year, we can help BCS members to be better at making links across the years as well – so many of the issues I described have been with us for twenty years.

I bought my first mobile computer in 1992. An HP95LX clamshell – 512KB of memory but it ran MS-DOS and had Lotus 123 already installed, along with email and a text editor, calendar. It was my constant companion for four years, longer than any mobile device since, and used a pair of AA batteries a week or so. I ran a C-compiler on it, wrote songs, built up 500 contacts that remain in my Outlook contacts to this day, and docked it with a PC every few days. I also treated it to a $400 2MB PCMCIA memory card.

I quickly learned my own physical limitations using it. Depending on ambient light, I couldn’t find people’s phone numbers on it, or read where my next appointment was. I have little fingers so I thought the keyboard wasn’t too bad, but when I look at documents from then, now, they are littered with typos and poorly laid out. There was a search facility that was fast if you knew exactly what you were looking for, but semantic searches were but a twinkle in TBL’s eye.

When the 95 died, I got the beefier HP200LX and that lasted me over three years, and since then a succession of 18-month Palm devices, which ran in parallel for a while with phones (guys and gadgets!), until the last four years when I’ve had a single device at a time – a smartphone that does everything in a mediocre fashion. My current contract doesn’t expire for six months but battery life is down to half a day, the main memory constantly runs out of space, and I can’t phone somebody when I’m outside unless I find some shade!

I hate to think how much money I’ve spent and how many hours I’ve wasted trying to get the technology to perform as intended, and coping with the way it intrudes into my life. Despite knowing enough to reconfigure it, mobile technology still doesn’t meet my needs, it disables me at the point of use, and it adds a drag factor to my life, diverting so much time into maintenance.

Mobile devices haven’t really got much better. Any of us becomes disabled when the technology doesn’t match the activity we are trying to carry out in a given context. But for all the downside, this gives us valuable insight. Think about what you feel about the developers in these situations. Now think how people with impairments might feel about the systems you’ve produced.

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