Abstract:
This paper explores some of the implications of the term ‘wearable technology. The author argues that the notion of wearability betrays a materialistic view of technology which may not be helpful for designers to find the means of fully facilitating the functionality of technology. It is argued that by taking the view that technology can be considered an extensive form of humanity a space can be opened for designers to explore how the body can be considered as an architecture for facilitating consciousness and that which we consider technology to be a means of distributing consciousness by means of an extended body. The paper/presentation sketches out a new design territory, whereby non-apparent activity might be facilitated. The paper calls into question some current approaches to usability founded in socio-cultural metaphors and is intended to provoke thought rather than to provide answers.

Key words: Industrial design, terminology, critical vocabularies, technology philosophy.

During the early part of the 20th Century Benjamin Lee Whorf a self-taught ethno-linguist developed a hypothesis of linguistic relativity. The Whorf hypothesis suggests that “all observers are not led by the same physical evidence to the same picture of the universe, unless their linguistic backgrounds are similar or can in some way be correlated.” (Carroll, 1956) Whorf died before he could test his theories, but his ideas resonate today. In recent times we have come to accept that the picture of the world we hold is relatively constructed from the words we use. Whorf looked at the Hopi people of North America, whereas English presents a temporal world for example, Whorf revealed how the Hopi language is timeless, founded instead upon the validity of observation. When Whorf studied the Shawnee something striking was revealed. The English phrases ‘ I push his head back’ and ‘I drop it in the water and it floats’ are conceptually dissimilar, they appear to us, the English speakers, to be entirely unrelated. However written in Shawnee both phrases can be deconstructed to demonstrate (i) A condition of force, (ii) a point about which movement occurs (iii) to cause to move or stop and (iv) an action on my behalf. “ni-kwoek-ho-to” (Carroll, 1956) Through the illustration of the Shawnee
language, Whorf claimed that language determines conceptualisation. Amy Stafford (Stafford 2005) has questioned Whorf, referring to Suzanne Romanine she points out how if we are so determined by our linguistic cognition, as Whorf believed, then how can we have independent thought within culture, after all words are subject to variable interpretation even within families. (Romain, 1994) After Lacan we know how the deeply implicit and very human process of constructing language is as an essential component of the development of our early being in the world. Through careful semiotic analysis we can deconstruct our language to reveal some truth about the unconscious shaping of our habitat. Its impossible to write of course, Derrida reminds me that I don’t own this text, it is a negotiation between myself – as author – and yourself as the reader, though Derrida it must be said, seems to me to lack the beguiling transparency of Whorf. But fear not, this is no attempt to resolve linguistic complexities, neither is it an attempt to deconstruct some truth through semiotic analysis, rather this brief paper will be content to merely stake its place among those who recognise how the world is shaped by words we know. English gives us a conceptual vocabulary that both forms and informs our experience and understanding. We know this idea, it is not new, whether Wittgenstein or Popper we surely know this as an established idea, but it does no harm perhaps for designers to remind ourselves now and again.

Sometimes it is revealed to us how wrong our cognitive vocabulary has become. New technologies have a habit of doing this and people rush in with claims that such and such has changed the world. There are for example, any number of theorists who explain at length how space and time are distorted by electronics, how geography has shrunk and lives are determined by the emergence of new technologies. Virilio’s ‘Polar Inertia’, (Virilio, 2000) perhaps one of the most oft quoted texts in this respect sets out to demonstrate how media technologies have replaced real space. Half a century ago Carroll, reflecting upon Whorf, was surprised at how “the various grand generalisations of the Western world, such as time, velocity and matter, are not essential to the construction of a consistent picture of the Universe”. (Carroll, 1956) Since Whorf showed us how concepts can be relative, to claim shift and disjuncture could be interpreted as a failure to engage with the relativity of Western cognition. The world does seem to be different to us in the aftermath of the mobile phone for example, but of course the world itself is not changed, it is simply that the way we imagined ourselves in the world has been shown to be limited, our conceptual vocabulary has been shown to be inadequate. Whilst the world might seem to be distorted by the mobile phone, in reality there is no tectonic shift, rock remains permanent, it turned out to be a metaphor after all, not a geological shift. It might perhaps be useful for designers – who are by instinct pragmatists - to recognise this when we build our theoretical models of life in the midst of media technologies.

Which brings me to the focus of this paper – wearable technology. I wonder if the linguistic concept of a technology as something discretely wearable reveal something about our view of the world? You may now have the impression that I am something of a pedant, , but that isn’t the case. I have a particular dislike of this term, because I think it hijacks technology and limits our conception. The world become a little more constrained a little less rich after this unnecessary conflation of two far reaching concepts ‘technology’ and ‘wearing’ to create another, rather marketable and easy noun. Do we mean wearable electronics? That sounds terribly dull.

It is a particularly grating, materialistic view of things, the implication of the adjective ‘wearable’ implies that other technology is not wearable. It is materialistic because it
prioritises a material quality – the weight and bulk of the box – over other aspects. It betrays a view of the world in which technology is materialistic, just as it might if we used the term architectural technology or monumental technology, terms incidentally that we don’t use although they might easily apply in other circumstances. Of course I am coming at this as a designer, I can’t speak for other scholars, nor would I wish to, but I think the way this terminology remains unchallenged says something about the state of contemporary design. I want to play here with some ideas that point us towards a rather different way of thinking about technology, it is convenient that wearable technology serves this purpose rather well.

It seems somewhat facile to set aside the emergence of a new technological form for special distinction and to associate it with clothing, after all clothes are themselves a technology, they emerge through technological constructs. McLuhan realised that clothing is “an extension of our skin [it] helps to store and channel energy…” (McLuhan, 1964) Similarly spitfire pilots are recorded as saying that you don’t get into an aircraft you put it on. Is the Spitfire then a wearable technology? Well perhaps it is. Perhaps the idea of ‘wearability’ implies some form of tacit recognition of some kind of intimate relationship to the body. Wearable technology then becomes an extension of the architecture of the human body.

What if we think of all technology as something we wear, there would be no point then in having a discrete term ‘wearable technology’. We wear tools, wear the heat of fire, wear networks, vehicles and clothes. The trouble now is that we seem to have become overly fixated with the idea of wearing again. Why would we think we wear wearable technology when we don’t imagine that we wear our hands? We wear a contact lens, but we don’t really wear a heart valve, as Ascott has stated, “if the interaction is not evident to us we are no more users [of technology] than we are the “users of our eyes, ears, nerves and hormones.” (Ascott 1995 p.22-24.) This whole idea of technology somehow extending the body could be taken to be rather fetishistic, but we have to resist the images we might have of cyborgs. This is not some Geigeresque vision of flesh penetrated by gleaming metal, but a rather subtle recognition of how humanity and technology flow one into the other. When we separate them we must do this for convenience, but remember that the world is shaped by the words we use. Take Magee’s poem ‘High Flight’ for example:

Oh! I have slipped the surly bonds of earth  
And danced the skies on laughter-silvered wings;  
Sunward I've climbed, and joined the tumbling mirth  
Of sun-split clouds - and done a hundred things  
You have not dreamed of - wheeled and soared and swung  
High in the sunlit silence. Hov'ring there  
I've chased the shouting wind along, and flung  
My eager craft through footless halls of air.  
Up, up the long delirious, burning blue,  
I've topped the windswept heights with easy grace  
Where never lark, or even eagle flew  
And, while with silent lifting mind I've trod  
The high untrespassed sanctity of space,  
Put out my hand and touched the face of God.  
(Magee 1941)
Notice the way in which Magee mentions the aircraft only once but refers to that which 'I' (I made it bold to show up) have done time and time again. In Magees poem the spitfire is to all extents and purposes invisible, we might imagine Magee could fly, like superman. Good design can do this, not by making some kind of gross homo-avionic hybrid cyborg, but by enabling technology to become a coextensive part of the human body. This is what Heidegger meant when he wrote of 'too handedness', the hammer disappears when it is used to strike a nail, the pen disappears when we write. The technology I inhale everyday to prevent my asthma has a profound effect upon my life, it is utterly invisible but it has an aesthetic all of its own just as poetic as Magee’s spitfire, it lets me play football with my children. It doesn’t help me play very well, that technology may come later. Like Magee I don’t feel dehumanised by this technologically enabled experience.

‘Wearable’ betrays the rather pervasive way in which design has taught us to think of technology as artificial. One of the many problems facing early industrial design was life in industrialised society seemed to be making people ill. The velocity of technology was identified as antipathetic to the bodies nervous system, leading to fatigue and mental collapse. The nervous system was identified as acting as an interlocutor between the material world and the mind. One of the early roles of industrial designers was to find the means of distancing the human nervous system from technology. Designers resolved this by devising the means to simplify the encounter with technology, making it cleaner, simpler, quieter. In short they devised a functional aesthetic that ‘purified’ technology. If at the start of the 20th Century mankind had interacted with technology and come away grimed in sweat and coal dust and oil and deafened by its thunder, then by the 21st century we needed Designers such as Dunne and Raby (Dunne, 1999) to make its invisible presence visible. Such has been the success of industrial design that we are now find ourselves so remote from our technologies to be surprised when it hurts us.

Industrial design has given us a conceptual vocabulary that causes us to think of technology as something inhuman, (Lyotard, 1991) providing experiences that are prosthetic – simulacra - versions of reality. When early in the 20th Century, Gerald Stanley Lee wrote that machines ‘have become the subconscious body, the abysmal, semi-infinite body of the man’ (Lee, 1913) he had perhaps forgotten that, as Klaus Theweleit reminds us, that “there is no such thing as [human] biological evolution, that was already known in 1620 and now (thank Darwin) is long forgotten” (Theweleit, 1992) The idea that technology and humanity might be considered a coextensive episteme might sound today to an industrial designer like a metaphor. Design histories for example, are dominated by exemplars of material objects that provide the critical norm in prevailing modes of analysis deconstructing material manifestations of technology as prosthetic objects in culture, it might seem to be a given that technology and humanity have come to be established as distant episteme, even for McLuhan clothing represents some prosthetic. This might not merely be an accidental consequence of history, but rather design, immersed in a rhetoric of prosthetic modernism (Armstrong, 1998) may have backed itself into a cognitive model in which humanity and technology, have come to represent discontinuity.

I wonder how the Shawnee of Whorf’s time, unsaturated by the English language, would regard the complex media rhetoric in which designers find themselves today, would they recognise the underlying assumption of discontinuity so many theorists seek to unpick? I think we might anticipate – this can only be a guess – that the Shawnee would have something to say about our assumptions of the prosthetic. What would happen if we simply and stubbornly refused to recognise the prosthetic as a meaningful word? Our
complex critical theories which attempt to unpick the real from the prosthetic might fall away from our conceptual imagination, taking with it some of the other hegemonic western assumptions we accept as givens. Deleule has pursued the “indelible mark left upon the modern era” (Deleule 1992) by the Cartesian separation of mind from the body, Merleau-Ponty, among others has found the separation of objective and subjective knowledge of the world to be similarly problematic in consideration of the experience of perception through the body, itself being “of the world”. (Merleau-Ponty 2003) These are not entirely new ideas, Mumford’s ‘Myth of the Machine’ explored technology as an essential component of the psychobiological makeup of humanity. Mumford became obsessed with the implications of “power complex” (Mumford, 1967) and the growth of what he called megatechnics. So far we have just managed to bear out Mumford’s hopes in the face of von Neumann’s assertion, and resisted the impulse to enact mutually assured destruction, our fears today are somewhat quieter and more ‘moist’. Given the emergence of biotechnology, ideas of technology as inhuman can no longer be sustained, even as a simple taxonomy. Designers are going to need some kind of cognitive vocabulary that can provide a means to understand the relationships between people and the idea of technology – as an idea. Whilst we might not yet be ready to play with genetics, perhaps the arrival of biodesign might enable us to reflect upon our failure to engage with technology, perhaps we might even learn why people don’t seem to be crying out for wearable technology. Perhaps its because we – the designers – persist in making it material. There is now good cause to think about an aesthetic that is not rooted in materialism.

If we want to think about an immaterial aesthetic and we need some kind of ‘technology’ to support our design direction, we could perhaps begin to play with ideas from the science of how our own architecture works. Neurophysiology remains something of a mystery to designers, although it must be said that attempts to outline its concepts are bound to require a sophisticated background knowledge in its field. As a designer, I’m not trained in this respect, but ignorance has never stood in the way of designers, there is nothing stopping us playing with the way the conceptual language of neurophysiology changes our view of the world. At least when regarded by a designer, neuroscience itself is a rather slippery concept, part physiology, part physics, part chemistry, part psychology, part philosophy and it must be said with a conceptual foundation bordering on the metaphysical. If physics tells us that almost everything we imagine to be certain and fixed about our place in the Universe is probably wrong, then neurophysiology seems to brings it close to home, it destabilises things we like to imagine we own, like consciousness and freewill. The established model many designers hold of an outside world brought to the mind through the senses is challenged by neurophysiological evidence. Neurophysics suggests that consciousness may be a consensual agreement, a quantum event (see particularly Hameroff 1999), research in psychopharmacology - particularly in relation to research in the field of entheogenic chemicals – demonstrates how reality is dependent largely upon a shared chemical balance, not necessarily shared between species. Similar issues can be found in advanced research in developing biomolecular computation (Sometimes referred to as DNA computing) (Calude and Päun 2002), and quantum transistorisation (Shapiro et al 2001) Research with the direct connection of inorganic and organic material has similarly moved from fiction into reality with the fusing of the neuron to silicon array. (Straub, Meyer and Fromherz 2001) Such computers which until recently utilised farmed and ‘extracted’ bacterial DNA have recently taken a divergent turn with developments demonstrating incorporation, directly intervening into the higher functionality of the body. “Computers will continue to miniaturise themselves, though, eventually disappearing into a microverse where their
ever-vaster calculations and mathematical models will become one with the quarks and the charms." (Ballard 1992) Whilst it may seem somewhat premature to claim such technologies as likely to appear in everyday life in the near term, their emergence does invite questions of what we mean when we say we wear technology. What if we accept the neurophysiological realities of the body as an extended architecture?

Norretranders (Norretranders 1998) and Wegner (Wegner 2002) particularly point to the extent of the processing of the body which remains outside of consciousness. They draw attention to the manner in which hitherto ‘paranormal’ phenomena might be explained in terms of nonconscious or preconscious processing (Baars 1994). Wegner describes experiments with the planchette, automatic writing, pendulum and divining rods and draws upon phenomena such as blind-sight and phantom limbs in order to demonstrate nonconscious processes interpreted to give rise to consciousness. Prescience’ is employed as a terminology, ring-fencing certain ‘functionalistic’, processes of the body giving rise to later cognitive interpretation. Care must be taken to recognise the blurred borders of the non-conscious and the unconscious, automatic or ‘tacit’ (Polanyi 1966) when we play in the integrative processes of ‘knowledge’ in non-conscious actions of the body. Can design create technologies that appear as reflex actions of the body?

Can we usefully include phenomena such as automatism, unattended processing, subliminal processing, implicit processing and pre-perceptual processing (Baars 1994) or proprioceptive (Sherrington 1906) activity into our conceptual toolkit? We recognise the value of these phenomena already but we have no critical or technical language to codify their effects. For example in the phenomena we witness of children ‘jacked’ into computer games, to form a view that no meaningful place of differentiation or interaction exists in such a condition and to imagine that children’s consciousness is at play as much in a supposedly ‘synthetic’ world as in the ‘real’ world, technology is in effect anoetic. If children’s unconscious fingers flashing across the controller could be compared to the actions which facilitate our tongues chasing unconsciously around our palette or in the way experienced drivers become unconscious of motorway miles slipping past then we might have a real sense that we have become semi-infinite. What this means is that we need to get out of the linguistic mind set which produces terms like wearable technology and roots us firmly in the notion that technology is material. We will need a critical language that recognises and evaluates a notion of the body as a dissolved and permeable construct made up of the organic and the inorganic, the critical integration of those things we are born with and the things we make later. When we devise this critical language we will need to recognise too that we are not aware of most of the things our body does to make us conscious and that (shockingly) the best things are the things we do without realising designers have been involved.

The ancient Greeks had a word ‘Pneuma’, which can not be translated in our language today except as perhaps soul or spirit or even breath “…..an underlying essence or life force which ran through all things and animated or illumined them with Mind”. (Ross, 1997) It may well be that in the future, people will look back into their archaeology and find in our language a view of the world they simply do not comprehend, they may not even have a word for technology.


http://www.mnsu.edu/emuseum/cultural/language/whorf.html. 30 May 2005


