What things know: exhibiting animism as artefact-based design research
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My mentor's behaviour worried me a little. He insisted on doing 'lab work' on the most ordinary machines… He noted the degree of politeness, laziness, violence, or nastiness of all the automatic door openers he came across, going so far as to tip them, which usually left them quite indifferent. …He demanded that I respect my alarm clock on the pretext that the moral contract I had signed with myself – and that I tried to forget as soon as I sank into my dreams – was faithfully preserved by the mechanism and punctually recalled in the form of the alarm bell. He wanted me to get my electric food processor to admit what it took me for – an idiot, I discovered, in dismantling the thing, since it was impossible to make the blade go round without having carefully closed the cover (Latour, 1996: 211).

We are going to approach the issue of practice-based artefact-as-research in a slightly indirect way, so we need to begin with some loose guideposts.

Our First Worry (that things should be the other way round)
Ontological Politics

We are concerned that the debate to date has been too concerned with fitting creative practices into university research, and not open enough to the possibility that university research should be restructured around the creative practices.

Disputes about what qualifies as research are by necessity both political and ontological. Arguments for or against types of research will always involve sustaining or resisting culturally and historically specific institutional structures and processes on the one hand, and more fundamental assumptions about the nature of things, the nature of knowledge, and the way in which things are such that they manifest as knowable, on the other.

In fact, it is not just that questions about valid research involve politics and ontologies, but that research is the question that brings together politics and ontologies. If universities still have any power in our societies, it is as the guardians of what counts as research (and therefore as knowledge and so in turn what can and should be taught) (Kant, 1979). Declaring a practice to be research means politically authorising an ontological domain. This was Heidegger's point throughout his life: "In what does the essence of research consist? It consists in the fact that knowing establishes itself as a procedure within some realm of beings… Through the projection of the ground-plan and prescribing of rigor, procedure secures for itself, within the realm of being, its sphere of objects" (2002: 59).

In this light, we fear that the practice-based research debate has not yet reached the depth that it needs to. For example, the debate should at least countenance that the current institutional structure of the university might be incompatible with the ontology of certain professional practices, that the prescribed ground-plan of the one or the other needs fundamental restructuring for there to be a convergence; not that there can be no such thing as practice-based research, but that for there to be practice-based research, for such an ontology to be politically authorised within the university, the one or the other needs to be reconceived from its basic concepts. This may not be the case, but without at least contemplating this extreme case, there is a danger that ontological possibilities of the creative professions are being politically foreclosed.

Compared to this, we worry that too much of the debate to date has been about how pragmatically to fit the one (creative practice) with the other (university accredited research). For instance, whilst the institutional politics of the practice-based research debate are normally acknowledged, through references to this or that funding or accrediting body's definition of research, these are not as often as they should be framed by wider genealogies of the university, up to its current role in the globalisation of free markets. 1 Similarly, whilst contributions to the debate usually begin with ontological claims in the forms of definitions, there are rarely reflections on whether those domains so defined are at all open to, or currently subject to, transformation, perhaps as a result of political pressure. 2

We are not insisting on a revolution, and we are not confident that the following achieves the level of fundamental questioning that we are calling for, but we have opened this article this way to indicate that the following does
attempt to think ontologically
and in relatively new ways
about the domain of a creative practice that is not at the moment commensurable with university determined research
but that can be considered a form of research
that is significant enough to warrant demanding a restructure of university determined research

Our Second Worry (that things should be the other way round)
Designing for Use

We are concerned that the debate to date has been dominated by art, with the presumption that designing can be subsumed within the arts, rather than recognising that designing is quite distinct to the creation of artworks, and that its distinctness, in terms of aiming at usefulness, at creating means rather than meanings, involves stronger and more challenging forms of research.

In the following, we wish to focus only on design research, to the exclusion of art. We think that the advancement of the practice-based research debate has been limited by uncritically coupling art and design. Whilst both are domains of making, they are quite distinct, precisely in terms of the knowing involved in their different processes and outcomes.

We take the difference between art and design to centre on use. Design is the creation of useful things, things that only are what they are when they are in use. Functional attributes are necessary qualities of what designed artefacts are. By contrast art is the creation of useless things. There is of course always a kind of meta-use to art — futile objects should usefully frustrate the imperial economy of instrumentalism, for instance — and to a certain extent, even mere contemplation of mounted artworks in rarefied galleries is a kind of use. But in a quite prosaic sense, artworks do not lend themselves to being used for purposes other than their own ends, and certainly do not depend upon such handling to be what they are. Designs by contrast, no matter how much they foreground themselves, only make sense as means to doing something.

(Just for the purposes of clarifying this distinction, it is worth pointing out that we believe that when design processes are employed to produce exorbitant gift-shop mantle-piece dust-collectors, these outcomes are not designs, they are objet d'art (Dilnot, 1995). On the other hand, when artworks, particularly conceptual artworks, require use, that is to say, need to be used as if they were not artworks, but just equipment, to have effectivity or affects, then they are designs. A liminal example of such "critical designs" is the work of Dunne and Raby (2001; see also Dunne, 1999, where the issue of art/design is discussed).

We are using 'use' as the distinguishing feature of design precisely because of the special forms of knowing that use involves. As Heidegger notes early in Being and Time, summarising the key insight that opened the way for his Dasein-analytic of human being and thereby being in general: "The kind of dealing which is closest to us is as we have shown, not a bare perceptual cognition, but rather the kind of concern which manipulates things and puts them to use; and this has its own kind of 'knowledge' " (1962: [s15] 95). What Heidegger and people working in the space cleared by Heidegger 3 have taught us is that that knowledge (associated with accomplished use, i.e., not initially 4) is a quite distinct form of knowing, because it is:
embodied
just a skilled physical routine, but a know-how sustained by the wholism involved in co-ordinating physical acts (Dreyfus, 1992; 2001)
a fusion with things
just using tools, but incorporating tools into the felt-body and thereby allowing them to withdraw into the background of accomplishing an act 5
for a combination of the two reasons just mentioned,
tacit, 6 that is,
explicable but not abstractable
i.e., can be rationalised retrospectively but only ever in a situated or bounded way (Suchman, 1987)
regular but not consistent
i.e., follows rules but the rules can change
committed but not common
i.e., is felt to be true without being confirmed with others (Polanyi, 1958)
These last points indicate that use-knowledge has a phenomenological surety despite its tacitness: you know it when you use it; using it indicates that you know it.

To put this another way, means are not so subject to contextual variation as meanings. Uses are still context-dependent, but the spread of possible uses for any particular design is more constrained; some things just cannot be used in this or that way. Meanings can be played with, whereas uses only have the amount of play that is tolerated by the system; beyond that, it just will not work. From this perspective, much of the practice-based research debate that has been negotiating how to appropriately contextualise artefacts-as-research indicates that art is much closer to the textual knowledge of the humanities than it is to usage knowing of design.

Whilst use-knowledge is embodied and thingly and so tacit in everyday settings (including scientific research for example), the ones who must explicate it and make it as consistent and common as possible are designers. Design's ontological domain of research is use.

It is this insight that makes us think that design might warrant a rethink of the limited forms of knowledge around which the university is structured.

Our Third Worry (that things should be the other way round)
Animism

We believe that characterising a designed artefact in terms of animism, feeling that it is alive or aware to our use of it, is an indicator of a successful artefact-as-research, one that has come not only to embody knowledge, but also to materialise knowing.

Insisting that there is such a thing as practice-based artefact-as-research is easily parodied as a naïve pathetic fallacy; obviously inanimate objects cannot literally know; knowledge is strictly the prerogative of humans, the talking animals, which is why knowledge in the end should be communicable.

Despite the university, as the institution of the Enlightenment, proscribing the superstition of animism, it is apparent that such hypotheses are an everyday occurrence. We will explore this in relation to the work of Elaine Scarry below, but for now it is enough to admit that
wonder at technological devices, whether experienced or marketed, is more often than not cast in animistic terms — see in particular the current rash of popular philosophies of things (Droit, 2005; De Bottain, 2006; Busch, 2004)
most of us still experience moments of surprise and frustration or bewilderment when devices falter and reveal themselves as dumb and inert, suggesting that we were taking for granted a sense of the aliveness of things before this event
designing, as a professional creative practice, tends to happen via explicit animism, or what Donald Schön famously calls backtalk – when designers ask of abductive moves they make in sketch or prototype form whether they work (afford use) and how they should be improved. 7
On the one hand then, the continued prevalence of animism in relation to designed useful artefacts (devices) by lay users and professional designers, points to the fact that animism is an approximate way of explicating the presence of the tacit knowing that is particular to use. On the other hand, the occasional unembarrassed animist exclamations suggest to us that at those moments, the exclamant is experiencing a design that is no longer merely the outcome of professional practice, but the product of a research practice, one that has managed to generate new knowledge about the possibilities of devices in relation to human needs. 8

Or to put this another way, whilst we believe that animism can be interpreted as being present in all in-use devices, this does not mean that all designs are research; the animism of a design is only rarely explicit, and usually only when deliberately and carefully staged; only on such occasions, when the design makes present the new knowledge that it is embodying, is the design worthy of the highest award conferrable by the university. It is precisely a question of degree, the degree to which the design has made plain its animist knowledge, and the degree to which that knowledge is new knowledge.

In the following therefore, we are attempting an ontological exploration of the creative practice of design, courting animism along the way as the clue to a form of research that the university is perhaps not yet oriented to accept, or even notice.

We would like to make one last point of introduction however, one that concerns the significance of the knowing associated with design of useful things, a significance that we believe warrants its non-assimilative or disruptive incorporation into the university.

Our Fourth Worry (that things should be the other way round)
Sustainability Akrasia

The failure of awareness-raising efforts in relation to sustainable consumption is one example of a situation that points to the significance of designerly animistic knowing.

Significant effort over the last decade at least has been made to inform populations, particularly in the developed nations, of dangers associated with certain forms and rates of consumption. These efforts have largely been successful; most people have fair levels of propositional knowledge about both sustainability in general (understood generally, embracing both personal and planetary health) and specific ways of developing sustainability through everyday consumption patterns. However, this knowledge has not been successfully translated into action (Tonkinwise, 2005). Social science research from two directions, public health behaviour change and sociology of technology studies, now point to the importance of design. The hypothesis is that tacit use patterns are resulting in akrasia — the Aristotelean term for the inability to do what one knows to be the right thing to do — and that design is needed to facilitate changes in use patterns (Lorber-Kasunic & Stewart, 2006). It is design's ability to explicate the regularities and commitments associated with use that allow it to develop situated tactics, though not abstract principles, for facilitating sustainable behaviours. Sustainable designs either animistically disburden us of akrasia, by making actions more sustainable without our explicit knowledge, or animistically enable us to overcome akrasia, by making more sustainable actions easier and/or more desirable (eg Jelsma, 2003).

The politics of sustainability not only points to the importance of this form of knowing, but also makes clear the importance of generating new knowledge in this area. For in most cases, sustainable behaviours require changing our otherwise ingrained conventions about what constitutes comfort, cleanliness and convenience (Shove, 2003). In other words, successful sustainable designs need to manifest new knowledge about ways other than those dominant in the market today in which humans can interact with things.

Use knowing might be non-abstractable, inconsistent and non-universal, but it must be part of the university's project, via practice-based artefact-as-research, if our societies are to become more sustainable.

Elaine Scarry's Account of Making

Elaine Scarry is primarily a literary theorist interested in the ontology of making. It is worth noting that thorough attempts to understand the creative act of making are few. In one of her first major works, The Body in Pain: The Making and Unmaking of the World (1985), Scarry attempted to explain the making of an artefact-filled world through the extreme negative case of torture. Her insight came from the fact that torturers not only deprive prisoners of worldly things, but deliberately make artefacts harm prisoners. If one can be broken, and give up what is most dear, by tools being perverted into weapons, then clearly tools are axial to sustaining not just our everyday worlds, but the world as valuable. To explain we will paraphrase the last part of Scarry's book in three phases.

1 Responding to Feeling the Problem

Scarry is a profoundly humanist thinker. For Scarry, the human condition is to be sensitive to others; not just aware of others' minds, but of others' bodies. In particular, it is to feel the bodily pain of others, and to wish that perceived pain gone — to not wish it gone is not to actually to feel it. This empathy is so pressing, Scarry argues, that we are driven to search for and imagine a way of relieving the other's pain as if it were our own. To understand Scarry it is important to acknowledge the strange insight involved in coupling morality and imagination (Tuan, 1989). The artefacts that result from this empathetic drive therefore have the meta-purpose of making the world more humane, more valuing of humans and their embodied fragility, and therefore more valuable to humans.

When Scarry turns from the unmaking of torture to the making of artefacts, she begins with the standard philosophy of technology argument that made objects are projections of the human body. However, her argument aims to deliteralise this analogical starting point, from, for example, the hammer as an amplification of the clenched fist to the window as a realisation of the human desire to be protected from the elements and yet not blind to them. For Scarry, the shape of an artefact like a chair is therefore not defined by "the shape of the skeleton, the shape of the body weight, nor even the shape of pain-perceived" (1985: 290). Instead, the shape of the chair is defined by the shape of "perceived-pain-wished-gone". To explain, Scarry tells a story of one man's compassion for his pregnant wife's pain (in the form of body weight). In a "series of successive actions", the man's compassion moves from a perception, to an agitation, perhaps resulting in a caress; frustration at the inadequacy of this gesture then generates something like a "dance" entitled "body weight be gone"; 9 at a particular point these disappearing externalisations of the man's compassionate desire are noticed by the man to have possibilities for "enduring material form" (1985: 290); the dance expressing "perceived-pain-wished-gone" outlines the built form of something that now not only "relieve[s] the distress of her body weight far better than the dance", but will go on relieving her distress even when the man cannot be present, and will even be able to relieve the distress of others that the man does not know.

The point to be emphasised from this story for the purposes of this article is that the artefact can only do such distress relieving, particularly beyond its initial motivating setting, because it has been made to embody an understanding of human pain, an understanding that it acts on. The chair is structured by a knowledge of the human condition and is the enacting of that knowledge. This is what Scarry means to draw attention to when she de-literalises the standard claim that technologies are projections of human features; artefacts are projections/ amplifications/ realisations of the human feature for empathy rather than the hand or eye; they are how we distribute cognition into the world. 10 For Scarry, making resides in and arises out of an attempt to invest the nonsentient world with the

responsibilities of sentience. And it is through the act of making, that sentient awareness is materialized into a freestanding design "not by literally putting it in pain or making it animate but by, quite literally, 'making it' as knowledgeable about human pain as if it were itself animate and in pain" (1985: 288-289).

2 Anticipating the Other(s') Problems

Scarry's account of making is powerful because of the vividness of the situations she uses to illustrate her account. But for this same reason it might seem restricted to those contexts, that is to say, it is difficult to extrapolate beyond a very defined problem-solving version of designing. Scarry overcomes those limitations by clarifying the nature of the animistic sentient awareness at work in designs.

Scarry finds evidence for her conjectures about the nature of making in those moments when we users 'bite back' at things that harm us, hitting the door that pinches us, kicking the chair that collapses under our weight, cursing the cracked footpath on which we stub our toe. In a Freudian-style argument, Scarry does not see these everyday events as embarrassing childish reactions, but as demonstrations of the fact that we expect things to be sentient of our human condition. For the most part we move about the world unaware of the artefacts about us, on the expectation that they, in our place, will take care of our needs, and of the responsibilities assigned to them. When artefacts do no live up to this expectation, they surprise us with their "object stupidity", drawing attention to our background animism. For Scarry, our reaction to artefacts that die on us is an attempt to reinstate the sensitivity to our hurtability that is the origin of such artefacts: "The moment of revenge merely occasions the dramatization of the ongoing assumption of animism rather than occasioning the animism itself. The retaliatory drama [of] man-pinching door and door-kicking man must be seen within the wider frame of the fact that nine times out ten (…) the door has acted as though it were percipiently aware, and has done so because its design is a material registration of the awareness that human beings both need the protection of solid walls and need to walk through solid walls at will" (1985: 296).

Scarry is arguing that beyond relying on artefacts to do a specific job (relief of this or that pain), we expect artefacts to have a more generalised sensitivity to humanness; not just relieve the weight of this or that heavily pregnant woman, but also be alive to the variations of other heavier or smaller sitters, or people who like to rock back and forth, etc. This means that objects are not just materialised relief responses to the "specific sentient problem" they seek to eliminate, but must also know a great deal more about their human makers. Our society expects this awareness of possibilities to be built into artefacts, and as Scarry explains, we not only sue the designer for liability when products are not adequately aware, but we also, following Plato, expel these inhuman(e) products from our cities. What a product liability trial attempts to determine is what an artefact knows and of what it is ignorant; not only what it knows about humans, and what harms them, including how humans harm themselves, intentionally and unintentionally, but also what it knows about itself and the impacts it can have on humans. In short, legal proceedings decide whether products are sufficiently self-aware.

It is of course designers who put all this sentience into artefacts, either by allowing for other users or uses, or by constraining such unconventional use from happening. In this way, the act of designing has expanded from a very clearly defined problem to be solved, to the more wicked or swampy process of problem anticipation. Animism is precisely evidence that designing is moving beyond application of existing knowledge to a

determined problem toward the development of new knowledge, about what humans find problematic, and how to alleviate those problems.

3 Disclosing New Uses for the Human

Artefacts are therefore animated by design to allow us to be less concerned about the world, or at least aspects of that world. In Polanyi's terms, we can attend away from everyday things, from coping with the risks associated with negotiating this or that obstacle, and instead attend to larger scale matters of import, confident that the artefacts around us know how to take care of us, for the most part. 11 Scarry's chair not only relieves the pain of the pregnant woman better than a dance by her partner, but also enables both persons to "share in endless other concerns, work to eliminate other pains, so that increasingly the pleasure of world-building rather than pain is the occasion of their union" (1985: 291).

This reference to the benefit shared by both maker and the recipient of the thing made brings Scarry to a discussion of the 'reciprocity of making'. To the extent that the maker has empathised with and embodied the pain of those she makes for, she too experiences relief when the made thing alleviates that pain. Thus both maker and recipient are made anew, their bodies no longer in pain, through the benefit bestowed by the made thing. This is another reason why Scarry insists on the vivacity of the artefact: it not only knows, but acts on that knowledge; it is not only made, but makes, coming to have the same power as its creator (1985: 316).

This way of describing the creative reciprocity of artefacts suggests that it is quite open-ended, merely liberating the sufferer to whatever. But in fact, it is important to remember that the taking away of pain is also the giving of pleasure; and by corollary, the giving of pleasure is taking away a pain that one may not have yet realised that one had been tolerating. Given this symmetry, then the same focus can be brought to designing pleasure as is brought to designing pain away.

This final move in Scarry's account of making is crucial for her work to be plausible to designers. Her moving account of design as analgesic, in our experience, gains assent from designers, but only with regard to briefs where there is clearly someone in pain; her version of making and artefacts does not appear to be as easily translated to the more inventive and playful side of designers and designing. Nevertheless, we do believe that, in the light of this last 'remaking argument,' her claims are as compelling for the designer seeking to innovate entertainments as those trying to rid the world of suffering. And more importantly for this paper, they provide a way of understanding how such pleasurable artefacts might also be research, embodying an understanding of humans and human-artefact relations that opens humans to new possibilities.

An aside on Bruno Latour's affirmation of Elaine Scarry's Account of Making

If Scarry's account of making sounds too beautiful to be plausible it is worth indicating that quite distinctly and much more prosaically — though with much wit, perhaps too much — Bruno Latour has developed an almost identical account of making. What Scarry calls the 'series of successive actions' by which perception is exteriorized as product, Latour calls a program of detours or delegations (Latour, 1999). In one version of this argument, Latour's model is also a door, one that is initially ignorant of varying human needs for the door to be either open or closed (1991: 225-259; see also 1995). To make the door more knowledgeable, one may attach a human to the door — a doorman. But as this is a fairly

tedious job, one might eventually liberate the human by designing a door opening device that captures the knowing that the doorman was adding to the door. That the point of this exercise is to put humanness into the door is evidenced by the fact that we will then judge the door, or the design of the door opening device, in terms of its humanity, in other words, as if it were still a doorman: if the device is a spring, one might ask if the device is rude in shutting too quickly or discriminatory in terms of the force required to open the door. Design innovations come from a widened anticipation of possible causes of pain, that is, from deciding that the door (or its opening device) could know more, about different sorts of people who pass through it, and the different states of those people, and how those people relate to doors. As with Scarry, the motivation to design, or redesign in this case, comes from a generalised and increasing expectation of animism in artefacts. Consequently, Latour insists on a principle of symmetry when seeking to understand the design or use of technological devices, in which artefacts must be granted as much agency as humans. Where the modern is still shocked by such distributed agencies, the non-modern is content to treat as equal, or note that designers, in order to design, must treat as equal, human and non-human 'actants.' Again, and finally, as with Scarry, this agency includes the ability of artefacts to act back on humans, not only doing things on behalf of humans, but also getting humans to do things, for the benefit of both the human (steering them out of harms way) and the artefact (steering humans away from damaging the product). Designers describe artefacts that in turn prescribe user behaviour in order for the couple, artefact-human, to be as effective as the designer imagined (Akrich, 1992; Verbeek & Kockelkoren 1998)

Evaluating Artefacts in terms of what they Knowin-Action about Humans

From Scarry's account of making then, we learn that

1) designing is profoundly an empathetic practice. It is an embodied practice precisely in an interpersonal sense; its embodiment is not ipseity, mirement in my private body, but quite essentially an interpersonal embodiment, grounded in a shared body experience. It is not that the outcomes of designing bridge autonomous experiences; rather, designs, when successful attest to commonalities of experience; they attest to shared knowledge, an emotional intelligence, about what it means to be a body.

2) designing happens as be-thing-ing (Heidegger, 1967). Designing is perception in reverse; it externalises feelings as products rather than internalising products as feelings. However, as such it reaffirms that human being is extensive; humans project themselves out into things in order to perceive them, and in order to use them. Designers make use of this interpenetration, facilitating a fusion of humans and things. In other words, designed things embody a knowledge about human being-in-the-world, or better, human being-with/amongst-things.

3) designing results in what can be taken-for-granted. The outcomes of successful designing facilitate use without requiring direct attention. They can be used as means to accomplishing something beyond their own functions because the designs act as if they know what is required, sensing the needs, anticipating the feelings, of their users. This pre-emptiveness is a knowing, insofar as knowledge is what, having been learnt once, does not need to be learned again 12 — facts do not need to be re-experienced each time to maintain the facticity; that is the purpose of knowledge. However for this very reason, these designed things, and their embodied knowledge, get assumed, withdrawing into the tacit background.

These points deliberately mirror our earlier claims about the knowledge that is particular to use. Regular designing is therefore steeped in this felt-thing-knowing. When presented with a problem, with a problematic pain, large or small, designers find the felt-thing-knowing ways of responding to that pain. And the success of that designing will be assessed in terms of artefact knowledge, answering in many ways the question, 'what does this design of the artefact indicate that the artefact knows about humans?' here for example is Scarry's verbalisation of an aspirin bottle's answers to this question:

It knows about the chemical and neuronal structure of small aches and pains, and about the human desire to be free of those aches and pains. It knows the size of the hand that will reacdh out to relieve those aches and pains. It knows that it itself is dangerous to those human beings if taken in large doses. It knows that these human beings know how to read and communicates with them on the subject if amounts through language. It also knows that some hman beings do not know how to read or read only a different language. It deals with this problem by further knowing how human beings intuitively and habitually take cpas off bottles, and by being itself counter-intuitive in its own cap. Thus only someone who knows how to read (or who knows someone else who knows how to read) can take the off the cap and successfully reach the aspiring which, because the person not only knows how to read but has been made to stop and be reminded to read, will be taken in the right dosage. (1985, 305)

Whilst knowledgeable, this sort of designing is perhaps not research; it is not in most cases, the development of new knowledge. A fourth point from Scarry can therefore be added:

4) designing can realise new ways of being. Because designed things of use embody a knowledge that allows them to be taken-for-granted, humans can usually proceed through everyday life sonambulistically, mindlessly. In this coping mindset, humans are not alive to other possibilities; they are not sensitive to what would be problematic when reassessed in the light of other possibilities. The sensitivity of empathetic designers can lead them to a level of creativity where they anticipate problems, rather than respond to those that are currently being experienced. At such a point, the outcomes if successful, that is to say, if the outcomes are able to be incorporated into usefulness, will be new contributions to knowledge in two ways simultaneously. They will draw attention to the fact that something is problematic that has not to date been registered as problematic; and they will do so by creating an experience that can and should replace that which is now discerned as problematic.

Although the knowledge generated is in the applied domain, in use, it is nevertheless better categorised as basic knowledge. For what is disclosed is something about human nature, or at least the conventions that humans have to date naturalised through their inattentive use relations to knowing things. The successful design manifests not only that humans can be in other ways with the things around them, that humans can do other things, but that these ways of being and doing, feel better, feel truer to what humans at their best might be.

However, this knowledge, about human potentiality and tendencies, will still have all the partiality that characterises designerly use-knowing; it will only be approximately abstractable, because it will be embodied and inherent to the use of the thing. Or to put this other way around – and so turn what looks like a limit to the ability of an artefact to function as research into an opportunity – the experience, qua an experience, of usefulness, will, despite its partiality, attest to the presence of a knowledge, a new

knowledge about human-thing use relations. It will not be adequately verbalisable — this is why it is artefact-based research. But it will nonetheless be able to be attested to, and sharable, via use of the artefact, and the embodied sense of appropriate possibility that accompanies that use.

Feeling Surprising Flow = New Artefactual Knowledge

The sort of registration of new knowledge that we are talking about has been well captured by Nelson and Stolterman's way of describing a successful design outcome as "the surprise of self-recognition" (2003). They use this phrase to explain how the designer's job in essence is not problem-solving, but problem-finding. If clients can clearly define their problem, they are probably able to by-pass the designer and proceed directly to a fabricator. Designers are employed when something is problematic in a not entirely definable way. When designers propose a solution, success means not only that they have solved a problem, but also that they have successfully identified the right problem to solve. The client finds in the solution a version of the problem that they had not noticed, but that nonetheless is profoundly apt. The solution 'flows', in Czikszentmihalyi's sense, because it has the right balance of newness and correctness (1990).

Nevertheless, designers, working in a domain of knowing that is only partially depictable, cannot verbalise the problem definitively that they are solving and certainly not before the designing has happened, as one should in a return brief exercise for example. The nature of the problem, of what is problematic about the problem, is articulated, as far as it can be, with and as the designed response; 13 the new forms of action that it opens up thereby reveal what was being unspecifiably closed off before.

We are pushing Nelson and Stolterman's description beyond the pragmatics of client service relations, toward a more ontological meaning. But precisely because it references a form of cognition, a knowing that is not codifiable but instead arrives as a confirming ('re') experience (surprise), we find the phrase apt. In this case, the self surprisingly recognising itself in the form of a product alive with new forms of usefulness, should not be understood as an individual, but as a community, each member finding an aspect of itself revealed anew by the same mass produced product.

Nelson and Stolterman claim that theirs is a description of the model design job. We however believe that the exceptional nature of such a client reaction is evidence of design as research. This is not your usual design job, but it should be the expected outcome from a design-as-research project deserving of the highest degree a university can award.

In fact, to take this point further, we would insist that the design-as-research project is clientless. If the knowing manifest in designing involves finding a problem, then designing-as-research is not inherently problem-based. Or more precisely, if there is a client, or even an initiating problem, the research component of the project begins at the point that is extrapolatable beyond the specifics of this client, at the point that the designing significantly reframes the problem.

To this extent, we are disagreeing with the otherwise useful opposition that Steven Scrivener advocates between technology practice research and art practice research (2001). Design practice research lies between these two.

Noticing Lack of Misfit

We hope we have made clear that this designerly thing-use-knowing is not fully articulatable, and that in fact what is most salient about it, its embodiedness, is exactly what will be most resistant to articulation. However, telling is only one form of sharing, experiencing is another.

If Scarry's account of making proposes that the successful artefact manifests knowledge of humans, of human needs and possibilities, of problems and ways of responding, it also specifies that this knowledge is most manifest in the artefact in its use. It is not something that can be read from contemplation of the look of the artefact, or even from an account of its composition or genealogy. 14 It only is in the things use. 15

But in fact, even if that knowing is only present in the artefact's use, at that point, because it is proving useful for doing something else, its knowing will still not be directly apparent. For Scarry, as for Heidegger, the artefact's knowledge of humanness will be inversely proportional to its presence in use; the more usable, the less apparent the artefact and the knowledge it materially mobilises. Designed artefact knowledge is most apparent when it is comparatively not there; 16 sense its presence via negativa, when the artefact stops being so smart, when it reverts to being insensitively ignorant.

This would mean that a demonstration of artefactual research would need to involve experiences of the designed outcome at various levels of knowingness about the human condition. A range of experiences must allow user-interrogators to clarify what it is that is making them surprised with self-recognition. They should sense the shape of the activity-world that the artefact enables by experiencing its progressive foreclosure. If the artefact responds to a problem that the designing-as-research has revealed anew, then design researchers need to stage an experience of what is most problematic about the problem – those examining the artefact for evidence of new knowledge should be made to suffer pain, in order to sense the knowing carefulness that the designer has facilitated the artefact to enact.

Conclusion: Useful Universities

This paper has aimed to introduce designers to a poetic understanding of making developed by Elaine Scarry and increasingly ratified by Bruno Latour and other actor-network theorists. The latter are very clear in their polemic about the inability of 'modern' institutions like the university to comprehend artefacts (Latour, 1993). 17 This paper has been suggesting that this incompatibility between the university and everyday artefacts is tied directly to the difficulties associated with institutionalising design research. The crux of the issue is perhaps less acknowledging that knowledge is generated in the design process than acknowledging that knowledge is manifest in designed outcomes, in the animistic usability of artefacts. The ontological difficulty of accepting what is normally dismissed as childish projections onto, or reactions to, artefacts is the same difficulty that is associated with accepting that ontologies can be created by design, that design is knowing how to make the world more humane.

Acknowledgements

Endnotes

1 The exceptions are the contributions by Ken Friedman, which tend to dictate the authoritative history of the university in order to warrant a maintenance of the status quo. It is significant for instance that Friedman's histories never extend to current diagnoses of The University in Ruins –we are referring to the debate about the contemporary university generated by Bill Readings' important last book (1996). On this see the higher education issue of Design Philosophy Papers (Issue 5, 2003: www.desphilosophy.com). It should also be observed that current debates around research tend to still assume that the university is an a-cultural institution: that what counts as research in the United Kingdom, will, or at least should, be the case for the all the universities being built in China at the moment.

2 For example, on the one side, even though it is plain that there is a decreasing amount of time and space for fundamental research (on this issue, see Jacques Derrida's (2004) Eyes of the University: The Right to Philosophy, particularly the essay "The Principle of Reason: The University in the Eyes of its Pupils"), very few practice-based research papers explicitly negotiate the issue of whether they are referring to basic knowledge or applied knowledge, nor think it is at all problematic to take for granted that it is the latter (though in this paper, we are focusing on the former). On the other side, there are similarly few practice-based research papers that note increasing 'return-on-investment' pressure on creative professions, and the way that more methodical approaches to research can be seen as a way of increasing 'quality control' of creatives (on this see Jean-Francois Lyotard's (1984) account of performativity as a requirement of research in The Postmodern Condition). More intriguing is the isomorphism of much-advocated Schönian reflective practice and Foucault's diagnosis of confessional self-disciplining techniques (on this see the work of Alan Bleakley (2000), for example "Writing with Invisible Ink: Narrative, Confessionalism and Reflective Practice").

3 We are referring here to Maurice Merleau-Ponty's lived-body-based phenomenology but also to what has recently been termed the 'practice turn' in sociology and philosophy (Schatzki, et al. 2001).

4 On the different forms of knowledge at work in different levels of expertise, see Hubert Dreyfus' contributions in Benner (1996 – one of many versions of this hierarchy that Dreyfus has published). Kees Dorst has been working on a translation of Dreyfus' hierarchy to design (2004).

5 See the famous discussion of the blind person feeling the ground at the end of their cane Maurice Merleau-Ponty's Phenomenology of Perception (1962: 143). See also the work of Don Ihde (1979; 2001).

6 See more Michael Polanyi's Personal Knowledge (1958) than the much-cited-rarely-read The Tacit Dimension (1983 [1966]), as the former makes clear that Polanyi is not interested in finding a form of knowledge that lies outside of scientific rationality, but rather one that lies within it; one that is consequently not a black-box but merely proximal and situated.

7 "In the designer's conversation with the materials of his design, he can never make a move which has only the effects intended for it. His materials are continually talking back to him, causing him to apprehend unanticipated problems and potentials" (Schön 1983: 101); see also p.79 and p.135. For an example of an attempt to facilitate backtalk through software, see Fischer, G. et al (1991).

8 It will become apparent that our argument mimics Kantian aesthetics, where judgements of beauty evidence a private felt conviction of the presence of the reasonableness common to humans; or in terms of design, where judgements of animism evidence a private felt conviction of the presence of sharable tacit knowledge of human-device relations.

9 On the relation between the shamanism and things, see Michael Taussig Mimesis and Alterity (1993) and Alphonso Lingis The Imperative (1998).

10 Norman (1990) makes this point by distinguishing knowledge in the head from knowledge in the world as put there as designs.

11 Hannah Arendt (1958) makes a similar point when indicating that the privileged world of action, by which she means articulations in the agora, are only possible within the stability provided by the products of artisanal work. On this, but also with explicit reference to Scarry, see Timothy Kaufman-Osborn's (1997) Creatures of Prometheus: Gender and the Politics of Technology.

12 We learned this common sense explanation of knowing from Thomas Sheehan explaining the profoundly Aristotlean nature of Heidegger's thinking. Here is Sheehan's account (1995) of Gewesen, a pivotal term in Heidegger commonly translated as 'essence', or 'essencing', using examples particularly relevant to the practice-based research debate: "If we translate das Gewesen as 'what-is-as-having-been' we are privileging a linear view of time that sees some given process of development as having achieved its fulfilment, which fulfilment continues to have effect today. You received your doctorate after five or six years of study, and no matter how long ago that was, you have become and still are a doctor… It is possible to read the Greek perfect this way. In the verb mantheno, 'I learn,' the perfect tense mematheka means: 'I now know; I still know, as having completed a long process of learning.' Likewise, the perfect tense oida means: 'I know and still know, precisely as having completed a long process of 'seeing' that resulted in, and still informs, my present act of knowing.'" (218)

13 See Nigel Cross and Kees Dorst's work on the co-dependent determination of the solution and problem fields in research of expert design processes (for example, 2001).

14 Compare with Jeffrey Miekle's 20th anniversary celebration speech to the Design History Society (1998), in which he calls for design history artefacts to be brought out of museum cabinets and used in order for them to be properly understood.

15 Compare with the influential polemic in HCI by Liam Banno & Suzanne Bodker (1991).

16 Compare with Christopher Alexander's account of 'absence of fit' in Notes on a Synthesis of Form (1964).

17 Whilst the university has recently incorporated artefacts into the cultural studies discipline (material culture studies), this incorporation has come precisely at the expense of the making of those artefacts. Material culture studies seems to manifest product fetishism in the strictly Marxist sense, treating products as if they had never been produced.

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