Interminable design: techné and time in the design of sustainable service systems

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Abstract
This presentation works from the assumption that the design of the coming decades, in the name of developing our societies’ sustainability, will involve realising less materials-intensive ways of living and working (dematerialisation). Designing such sustainable product-service systems requires a quite different approach to designing than that which is prevalent today. In this paper, I explore:

1. the extent to which designing, of any specialism, and especially as it is taught in universities, continues to remain wedded to making things, that is, to techné as the know-how of manufacturing finished products
2. the extent to which ‘dematerialisation design’ involves something that can perhaps no longer be called a techné, less because its output is not a product, than because its output is not something that is never ‘finished’

Drawing on Martin Heidegger’s accounts of the Ancient Greek productivism that continues to inform modern designing, I argue that the design of more sustainable product-service systems will need to pay greater heed to how things change over time. Since designers tend to exemplify Marxist theories of alienated labour with their desire to create ‘once-and-for-all’s, something like ‘extended-designer-responsibility’ is needed, where designers are required to engage with their output beyond its production and sale/use.

As an epilogue, the paper discusses the way design students invest heavily in the production of finished products for assessment, but then invariably never pick them up, satisfied merely with the intangible mark they receive. How could this situation be exploited to educe designers of sustainable systems rather than technicians more unsustainable stuff?

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An ‘object’ is what gets in the way, a problem thrown in your path like a projectile (coming as it does from the Latin objectum, Greek problema)... I come across obstacles in my path (come across the objective, substantial, problematic world); I overturn some of these obstacles (transform them into objects of use, into culture) in order to continue; and the objects thus overturned prove to be obstacles in themselves. The more I continue, the more I am obstructed by objects of use...

We are beginning to become conscious of the temporal nature of all forms (and thus of all creation). Since entropy is beginning to obstruct us at least as much as objects of use are. The question of responsibility and freedom (this being the essential question of creation) arises not only in the process of designing but also in the process of throwing away objects of use. It may be that consciousness of the
temporality of all creation (even that of immaterial designs) will contribute to a future situation in which things will be designed a bit more responsibly, resulting in a culture with less and less room for objects of use to act as obstacles and more and more room for them to serve as vehicles for interpersonal contact.

Vilém Flusser ‘Design: Obstacle for/to the Removal of Obstacles’

Prologue

Scene 1
Design Lecturer’s Office

Student (bursting in): I know the Object Relations assignment was due yesterday, but I got so into it, I just couldn’t stop researching and writing. I’ve created this whole bound report on ‘my favourite thing’, like a scrap book, or a shrine, like you said. ‘Cause you know I just couldn’t live without this mobile. I mean not any old crappy phone, but this particular one. It’s so cool. And it’s so me. Everyone says so. I worked out how many times a day I look at it, or just touch it in my pocket. It feels so cool. I even tried to go a day without it, on the weekend, and I nearly went insane. And I did all this background stuff, like you told us, and it just made me realise how amazing and complicated this tiny thing is. I mean I didn’t understand most of the technical stuff, but I found this excellent account of how they’re made. It made me love it on a whole other level. Anyway, it’s all in here. This is my best assignment ever. I swear I’m going to frame it when I get it back. So I’m really sorry it’s so late, but I got so much out of it. Thanks so much. Should I just put it here?

The assignment is tossed onto pile which falls over, spreading over the floor. We can see that nearly every essay is about a mobile phone.

Scene 2
2 weeks later

The assignment, marked, is amongst a pile of marked assignments outside the Lecturer’s door awaiting pickup.

Scene 3
4 months later

The assignment and most of the others are still outside the Lecturer’s door. The Lecturer comes out and makes room to put out another pile of marked assignments. As the Lecturer turns to go into the office, a student walks past talking on a mobile.

Lecturer: Hey. You never picked up your assignment.

Student: [looking annoyed at being interrupted, then, seeing that it’s the Lecturer, after asking the person on the other end to hang on a second]: Oh yeah. Sorry.

Lecturer: And that’s not the phone you wrote about.

Student: Oh yeah. I got another one. And actually, then that broke, so I had to get this one. 3 phones in 3 months. Unbelievable. [Returning to the phone call and wandering off, without getting the assignment.]

THE TECHNICAL LIMITS OF ECODESIGN

Following the 1987 Our Common Future report’s advocation of ‘ecologically sustainable development’ (UNWCED, 1987), designers, working more or less with the legacy of alternative technology movement, added Design for the Environment (DfE) to the growing list of DfX concurrent engineering strategies (Fiksel, 1996).

However, it is now apparent that this approach to ecodesign is inadequate. The focus on only minimising a few of the most direct sources of ecological damage in the development of each new product, has delivered
results that are too piece-meal (McDonough & Braungart, 2001). The environmental improvements achieved through DfE and eco-efficiency more generally have not only been eroded by economic growth, but, it appears, have fuelled economic growth through Rebound Effects (Jalas, Plepys & Elander, 2001).\textsuperscript{iii} The task remains for designers to maximise the creation and promotion of more sustainable ways of living, by working with complexes of indirect and consequential impacts.\textsuperscript{iv}

Compared to this brief, DfE has been far too ‘one-at-a-time’. Put another way, it has been far too technical, shying away from cultural change programs. DfE’s technical solutions have been distinct from any form of behaviour change (eg user-studies are used to determine what will work, rather than what uses need to be changed) let alone value change (eg designers produce neutral instruction manuals, and marketers produce ‘green’ brands, rather than both working together to persuade users of the value of the new lifestyles opened up by new products and services).\textsuperscript{v}

This paper will argue that proceeding ‘one-at-a-time’ and proceeding technically is the same thing, the same obstacle blocking design for sustainability. I will be suggesting the DfE’s ‘now-this-now-that’ approach is not just the pragmatics of every journey starting with the first steps. To stretch the metaphor, there is an ontological barrier to building up speed, from walking (per unit) to running (per system). I will argue that a qualitative leap is needed, out of the technique that ecodesign \textit{qua} design is locked in. This gap between current technical attempts at developing sustainability and the sort of designing required is however not that which is conventionally identified between working with parts and holism, nor that between material entities and immateriality. It is rather a question of time, of working with or against changes over time.

**DEMATERIALISATION DESIGN**

Having diagnosed the rebound effects undermining environmental performance gains over the last decade, sustainability research institutes such as the Wüppertal Institute redefined the problem from one concerning the qualitative specifics of ecological impacts (eg this or that toxin or pollutant or species extinction), to the more holistically quantitative agenda of material flows (Heiskanen & Mikko, 2000; see also Reijnders, 1998). In this context, each instance of ecological damage is considered only as the symptom of a wider unsustainability deriving from how weighty our lifestyles are in terms of the materials that they requisition and then dump with increasing alacrity. Design for Sustainability (DfS), as opposed to Design for the Environment, aims at \textit{dematerialisation} — the reduction of the materials intensity of both any moment of living and the materials throughput of any period of living — by 90% for all developed nations according to the targets of the Factor 10 Club (Schmidt-Bleek, 1996).

Much work is now emerging about how we can begin to reduce our MIPS — Materials Intensity Per unit of Service. It is important to recognise that MIPS can be reduced not only by reducing the amount of materials required to deliver a fixed amount of service, but also by increasing the amount of service delivered by any fixed amount of material. Rather than the purely technological challenge of getting more uses out of each product (multi-functionality),\textsuperscript{vi} the latter can refer to the large gains that can be made by getting more use out of things, that is the longer use-lives made possible by design-for-reliability, -maintainability, -repairability, -upgradeability, for example, and/or getting more users for each thing, that is multiple users through business-to-consumer professional services rather than product purchase, business-to-consumer facilitated product sharing (leasing), or consumer-to-consumer product sharing (for one of the clearest schematics of dematerialisation strategies, see Cooper, 2002).

Before moving on, allow me to underline the point just made about MIPS reduction strategies. In line with heuristics emerging from more than a decade of Life Cycle Assessments,\textsuperscript{vii} in addition to conventional decreases
in operational energy consumption and pollution, increased use-life remains the greatest opportunity for gains in sustainability (Cooper, 1994).\textsuperscript{viii} To achieve longer and more intense use-lives however requires the sort of reliability that often only comes from increased initial materials intensity. In these cases, what could be called ‘rematerialisation’ can afford a net whole-of-life dematerialisation strategy. I will return to this below.

Across all these emerging ways of designing for sustainability is the encompassing notion of Product-Service Systems (PSS).\textsuperscript{ix} This term recognizes that what is axial is less the product per se, than the function that it delivers over time, as the vehicle for a system of services.\textsuperscript{x} Design for Sustainability’s brief is then the design of dematerialising PSSs.

Following Ezio Manzini’s lead (eg Manzini, 1999; Manzini, Vezzoli & Clark, 2001),\textsuperscript{xi} strong research is now generating guidelines for the DfS of PSSs (see www.suspronet.org and www.pss-info.com). Whilst noting that ‘From a design perspective the development of PSS represents a new challenge because the focus of the design activity shifts from the definition of new products to the re-organisation of existing elements on the basis of new needs and values’ (Morelli, 2003: 75), Nicola Morelli, in one of a series of articles on this issue (Morelli and Loi, 2001; Morelli, 2002), maintains that ‘designing a new PSS requires an extension [my italics] of the traditional designer’s competence into new logical domains, such as the social construction of technological systems, market-oriented and organisational domains’ (Morelli, 2003: 98).\textsuperscript{xii}

But is dematerialisation design merely an ‘extension’ of current design practices? Are current design practices technically capable of designing sustainable systems? And if it is possible to design Product Service Systems in an enlarged, but essentially similar, way to the design of Products, is this adequate for the larger problem of sustainability? Will the products of such design techniques, namely services, be sustainable?

In what follows I would like to temper the optimism of these initiatives. Given the instrumentalism that I have suggested may have been at the heart of ecodesign’s limits, I am concerned by the ‘productism’, that is, the product-centric-teleology, that seems to be being carried over from (eco)design into DfS, despite the fact that the objects of this designing are service systems.

The Function of Design History

To underline what I am suggesting is the problem here, it is worth pointing out that what is being called for under the banner of PSS is far from new. The historical ignorance amongst many of those advocating dematerialisation design is itself of concern.

Materials efficiency — or in this case, in order to capture the net efficiency that is being sought, let’s call it materials effectivity — has always been considered part of good design. This is also the case with multi-functionality and reliability. To this extent, it could be argued that modern industrial design, at least that of European origins, rooted in functionalism, has always been inspired by the ideal of dematerialisation design.\textsuperscript{xiii} Certainly Alain Findeli’s design education insights and recommendations about cultivating a visual intelligence for praxical social system interventions make this lineage explicit (Findeli, 2001),\textsuperscript{xiv} as to a lesser extent do Richard Buchanan’s historically inspired arguments for the broadening of design beyond the orders of signs and products, and into process and culture (Buchanan, 1995).

More directly, the design of services, as something that should be inherent to contemporary design practice, is also not recent. The way Chris Jones and Christopher Alexander followed design’s methods into different forms of wholism that took design ‘beyond the object’ (Thackara, 1988) has been well documented, by C. Thomas Mitchell for example (Mitchell, 1993; Jones, 1996). These ambitions converged with the discourses of post-
industrialism on the one hand (Cross, 1981, but also the Italian perspective from Branzi, Diani, and Morello) and the emergence of systems theory on the other (Jonas, 1993).

Representative of this constellation was the work Abraham Moles, who was advocating Product-Service-System design a decade before merely reformist ecodesign got its act together. I single Moles out, not merely to honour his foresight, but because I will be engaging below with a particular aspect of his version of this imperative. The question then perhaps needs to be asked, why, given these decades of work on expanding design into the delivery of less materials intensive ways of living and working, is design still the proliferator of stuff. There are clearly some stubborn obstacles persisting beyond the analysis of these many dematerialisation advocates.

Some of these may be external to designers. Perceptions of design within the current politico-economic dispositif may constrain its ambitions to expanded influence. However, displacing these issues for the time being, I would like to explore what I believe to be internal constraints to design's capacity for taking up these calls to service system design. By thinking through the nature of design, we will see that, theoretically, there are some structural horizons that need to be surpassed to undertake DfS.

Maintaining Changing Things

To try to reveal these horizons, I want to focus on one particular type of dematerialisation design. I am going to ignore the larger ‘needs-based’ innovations that require significant cultural change, such as ‘life-style downsizing’ or ‘voluntary simplicity’ on the one hand, and co-housing on the other. I am also not examining the ‘results-based’ innovations that require the design of service systems, such as functional sales. Instead, I deliberately want to focus on a type of dematerialisation design that at first appears to lie very close to conventional product. Whilst this aspect of PSSs is not very glamorous, its successful introduction would restructure the nature of our societies and their economies.

As I indicated before, I want to draw on the work of Abraham Moles, who in 1985 (in English), two years before the Bruntland Report, was advocating what is now termed ‘extended producer responsibility’. Working within the discourse of the time around the expanding ‘service economy’, Moles calls for ‘The Comprehensive Guarantee’ (Moles, 1985). Noting the clear whole-of-life cost involved when owners of products have to go to the trouble of getting broken products repaired or replaced, Moles proposes that all bills of sale be accompanied by a contract ensuring for a fixed period not only full repair whenever needed but also compensation for inconvenience and loss of product use time. Moles then notes that the consequence of such a mandated requirement would be the substitution of ‘the concept of a maintenance process for one of repair,’ (59) ‘a transformation from a society that supplies goods to one that supplies services centred on goods,’ (60) a shift from ownership through ‘functional ownership with a time limit’, to ‘a world of rent’ (62) and ‘a society of functions rather than of objects that support them.’ (63)

Having noted the resistances in ‘consumers’ to such a vision, Moles goes on to note that ‘it is by no means certain, in fact it is obviously unlikely, that industrial producers will agree without resistance to new forms of specifications that stretch their social role far beyond their present capacities.’ (64)

The nature of those stretching specifications is spelled out by Moles in his subsequent article on ‘Immateriality’ (Moles, 1988), where the topic is the obverse of that of ‘The Comprehensive Guarantee’, namely, that since ‘Any immaterial civilization will be heavily materialized because its immaterial products are necessarily linked to the mechanical infrastructure that generates, stabilizes and governs them’ (30), then ‘The immaterial civilization must be reliable’ (27). That reliability comes not from creating ‘new’ objects (31) but from ‘a maintenance mentality’ (26), ‘whereby designers will need to take into account the micropsychological analysis of the
object/user binome and deduce from each aspect of this interaction not only the conditions in which the object will fulfil what was traditionally called its function, but also the conditions of its permanence with respect to the role it is to play in the life of the user’ (Moles, 1988: 64).

It is designing toward this ‘maintenance mentality’, dematerialising by lengthening the use-life of products through proactive servicing and repair, on which I want to focus. This is not only because it lies close to the conventional design of products, but also because it contains a strong vision of sustainability; not a once-and-for-all sustainability, but rather a process of sustainment: maintenance, repair, adjustment.

Chris Jones calls this ‘Continuous Design and Redesign’ (Jones, 1983). Allow me to name this ‘Interminable Design’ after Freud to underscore that what is at issue is never finishing with the design of anything. It is this ‘designing with finitude’ that appears to offer a clear route to the holistic source-problem of unsustainability.

What then is the designing that could initiate and sustain this process of sustainment? What sort of PSSs could be designed to facilitate this? And, how stretched would designers need to be to be up to this challenge? To what extent do their current techniques allow or prevent the development of these changing-in-time products?

By taking a detour into the nature of techné, in its Ancient Greek sense, following Martin Heidegger’s interpretive translations, I will argue that what needs to be stretched is the very ontology of design.

Mass Production versus Customisation

The modern conception of techné, transliterated as technique, emphasises the rationality of making’s know-how (the logos of techné). Modern critics of the imperialism of technical rationality worry about its instrumentalism. Things lose their specificity as they are quantified as means to unquestioned ends. Everything is reduced to the sameness of a common calculable denominator.

In this regard, techné is most often contrasted unfavourably with the more situated practices of political judgement. The deliberative qualities of phronesis remain more open to case-by-case details, acknowledging autonomous difference in all that such acumen dialogically negotiates. For Aristotle, the unpredictability of politics is no place for the homogenising calculations of techné. Plato’s attempt to design a system of ordered social interactions following the model of the craftsman betrayed something fundamental about society, according to his student Aristotle.

Given that PSSs tend to require greater direct people-to-people interaction than standard designs aiming only at comparatively more predictable person-to-product relations, it would seem that the logic of design techniques may not be appropriate to the task of dematerialisation. PSSs require the recovery, cultivation and sustainment of what is these days called ‘social capital’. Such enablement requires the sort of flexible prudence for which there are no rules, no techniques.

However, I believe that this account of techné is too stark, too modern. By back-projecting current accounts of ‘technology’, it misses both the alogical aspects of techné — artful craft — in Ancient Greece, and more pertinently, the phronesic aspects of modern design practice.

Even though design’s origins exist in the division of labour — designing being explicitly separated from the craft of making and placed at its head, calculating and directing the most efficient means of causation — the field of design studies is now making clear that the skill of designing is never totally rationalistic. Designing involves the tacit discernment of aesthetics, a prejudicial yet flexible analogue of ethical hermeneutics. There is clearly an art and craft to the science of practising design.
Despite the bridging that designing appears to accomplish, there is however a crucial difference between *phronesis* and *techné*, one that I will argue marks a hiatus between product design, at least as currently taught, and dematerialisation design. To access this, we need to bracket our modern notions of rationality when attempting to understand *techné*’s instrumentalism. To do this, it is worth contrasting *techné* not with *phronesis*, but *phüsis*.

**FINISHING THINGS OFF**

Martin Heidegger’s 1939 essay ‘On the essence and concept of *Phüsis* in Aristotle’s *Physics B I*’ (Heidegger, 1998) is helpful in this matter. Heidegger’s essay aims to recover a sense of *kinesis* or ‘movedness’ as the essence of all being. Most radically, Heidegger tries to demonstrate that, in terms of *phūsis*, all things are in motion, especially those concrete everyday things which we moderns think are ‘at rest’.

But are bedsteads and garments, shields and houses moving things? Indeed they are, but usually we encounter them in the kind of movement that typifies things at rest and therefore is hard to perceive. Their ‘rest’ has the character of having-been-completed, having-been-produced, and, on the basis of these determinations, as standing ‘there’ and lying present before. Today we easily overlook this special kind of rest and so too the movedness that corresponds to it, or at least, we do not take it essentially enough as the proper and distinguishing characteristic of the being of these beings. And why? Because under the spell of our modern way of being, we are addicted to thinking of beings as objects and allowing the being of beings to be exhausted in the objectivity of the object (Heidegger, 1998: 192).

To reveal this ‘movedness’, Heidegger is at pains to refuse the common misinterpretation of Aristotle, that the difference between *phūsis* and *techné* is that between the autopoietic and the allopoietic. What we today call ‘nature’ is not that which makes itself, as opposed to everything else which is the product of human making, ie the artefactual, because *phūsis* is in no way a form of making. The difference lies not in who or what does the making, but between the completed product of making and what just is.

Now, in typical Heidegger fashion, this distinction is the opposite of what it at first seems. In terms of movedness, the previous quotation indicated that things that are as a result of *poiesis*, eg besteads and the like, are at rest. They lie present (are pre-sent), finished. By contrast, *phūsical* things ‘just are, but in a way that manifests a dynamic presence (a presencing). Far from being cast as something permanently present, *phūsis* must be understood as always already in-formation; at any one time they are capable of being some things and resisting being others; at every moment they are becoming and withdrawing (at the same time, i.e. becoming X by withdrawing from being Y).

Heidegger notes that to ‘lead the way toward’ this sense of being *phūsically*, Aristotle invented a term: *entelécheia*. Heidegger translates this term as ‘holding (echei) itself (en) in its end (telos)’ (217). Again, meaning the opposite of the way it is immediately read, *entelécheia* designates not that which has reached its end, as if its end were different from what it has, up until that time, been, but that which is, at all times in its becoming, what it is and aims to be. With this term, a clear distinction can now be drawn between the outcomes of *techné* and *phūsis*.

A table is not a table until it is finished. It is not what it aims to be (its telos) until it is completed (by a maker, arché, who also happens to lie outside it). When it is done, when the making is over, the table (as opposed to the phūsical wood — this is the whole point, so I will come back to this) has no becoming but instead just is. It is (at) an end. This is very different to a tree, which is never over and done with. It is always still on-the-move.
However, though forever ‘on the way’, it is nevertheless always also what it aims to be. Though never completed, the tree is at every moment complete as a tree. Even when a sapling, a seedling, or a seed, and also when rotting wood, it is never (at) an end, but rather has its end as and in what it is.

Appropriators of Aristotle like Arendt have pointed out that this enteléchiāl quality of phüsís is not denied to humans, who as deinon are invariably ‘contra phüsís.’ Humans manifest the complete-in-being-incomplete-ness of phüsís when dealing with each other, i.e. when engaged in praxis, as opposed to when they make phüsical beings into artefacts, i.e. when engaged in poiesis. Phronesis, the discernment required for praxis, is then analogous to the entelécheia of phüsís. The difference between techné and phronesis is not that between efficient and prudent action, making something according to a model and making oneself according to improvisation, but between that which aims to finish something and that which aims to sustain something.

**Disposing of What is Taken for Granted**

Heidegger’s efforts at recovering the Aristotlean sense of phüsís are undertaken out of a fear that we moderns are losing our ability to affirm the movedness of that which is in a state of becoming. A certain (Platonic) metaphysics of presentness is making us see only what is present, that is, what appears to be as if only after having-been-made, what Heidegger in the citation earlier called ‘objectivity’, and what I called above ‘objectism’. Heidegger was of course concerned with being and time. He attempted to deconstruct the tendency of humans to let what they encounter lapse into being merely beings, things just present, as if outside time.

The symptoms of this are that: 1) such merely present things are neither impressively there, shining forth in their thereness at the moments when they are; 2) nor is the way that they are not always there, noticed; their not-always-being-there, their phusical coming-to-be and unbecoming, is not acknowledged as being also there along with them. Produced things then, as finished, as merely present, even lose their having-been-produced-ness. They become alienated as so much stuff, seemingly constantly there at hand.

In a later essay (Heidegger, [1954] 1977), Heidegger charts this transition: > from ‘the real [Wirkliche] [as] the working, the worked [Wirkende, Gewirkte]; that which brings hither and brings forth into presencing, and that which has brought forth and brought hither… the presencing, consummated in itself… entelecheia’ (160)

> to the real as ‘that which results from an operatio… that which follows out of and follows upon an actio.; the consequence, the out-come [Er-folg] … that which follows in fact and… is the factual [Tatsächliche]’ (161-2)

> then to ‘the real now show[ing] itself as object, that which stands over against [Gegen-Stand]… We shall now name the kind of presence belonging to that which presences that appears in the modern age as object: objectness’ (162-3)

> and finally, ‘Objectness changes into the constancy of the standing-reserve, a constancy determined from out of Enframing [a reference to Heidegger’s famous ‘The Question Concerning Technology’] (173).

In another essay from the same period, Heidegger explains this ‘constancy’ via Rilke:

The objectiveness [Gegenständige] of the world becomes constant [ständig] in representational production… In this, it is true, there is another transformation of things into the inward and invisible. However, this transformation substitutes for the frailty of things the factitious constructions of calculated objects. These objects are produced for consumption. The more quickly they are
consumed, the more necessary it becomes to replace them ever more quickly and easily. That which is enduring about the presence of objective things is not their resting-in-themselves in their own world. What is constant about things produced as mere objects of consumption is the substitute [Ersatz]. (Heidegger, [1946] (2002): 228, 231)

I have cited extensively here because it is crucial to see that it is the technical making of things that leads those things to being received as permanent; that they were made, that is, that they have not always been what they now are, is forgotten. Instead, we take these objects for granted, assuming that they just are. It is therefore this very presumption of permanence that allows us to consume these objects, shuffling between them at an increasing rate. It is the very finishedness of modern-made things, the way they are cast out into the world as from then on unchanging, that, far from granting them long lives, destines them to short use-lives and disposal. They can be cycled through in a relay of never complete means and ends only because they are technical beings.

Now, all this is how things are treated, but it is not how they are. As Heidegger famously revealed in Being and Time, we are constantly surprised by things not being constantly there for us. We only notice their being, and their having-been-produced, when they break down. At these times, products re-assert their being-in-time, withdrawing phusically from time to time from the technical system into which they have been requisitioned. This has frustrating consequences for our no-time-out economy, but if we were Presocratics, we would, according to Heidegger, consider such wear and tear the norm rather than the exception. It is the way of things to egress, evade and elude, rather than stay put, no matter how technologically sophisticated we get. Something there is that seems to resist being present.

Three vital points emerge from all this:

Firstly, here is a clear account of our societies’ unsustainability. Our ‘taking for granted what we have made because we have made it seem complete’, allows us to proliferate our world with things, some disappearing in use, but most just hanging around disused, persisting in unproductive or polluting ways. We are then literally unsustainable, unable to sustain all that we scatter about ourselves. We are only ever able to produce more presents, each quickly neglected. Heidegger’s Aristotelian account of techné richly captures these contradictions of consumerism, the constant manufacturing of durables for temporary use. Exemplary of this technical feat, making permanent even what we intend only to be transient, is of course plastic. It is also inherent in that paradigm of technical making, obsolescence. Nuri Bilgin, in an article on which Moles relies, captures this perpetual re-production of the perpetual with a quite Heideggerian term, ‘temporary eternity’ (Bilgin, 1980: 122).

Secondly, what is at issue is not demonic humans as compared to nature. The problem lies merely with the dominance of one of the many ways that humans are currently doing what they do. The solution is not, as Heidegger is often misinterpreted as advocating, merely to let things be, in their state of dilapidation for example. A 1941 lecture by Heidegger begins with ‘guidewords’ of Periander: ‘take into care beings as a whole’. Humans have a responsibility to sustain the presencing of their world. It is incumbent upon us to maintain and repair the beings that sustain us, while heeding that ‘permanence is contrary to the egressively enjoined essence of being’ (Heidegger, 1993: 102).

Thirdly though, we do appear to have an addiction to this imperialism of techné’s way of finishing things off. It is not coming to us naturally anymore to abide with what we make, sustaining its changing ways of being. Rather than respond to the changes-in-things-over-time, we react, with increasing violence. We replace or displace the offending item. We reimpose our technical framework on this refusal of things to stay as we made them. To this extent, the failure of developed nations to foster a post-industrial society becomes evidence of the correctness of Heidegger’s Aristotelian diagnosis of our techné-fix. Far from evolving to systems of sustaining services, we have redoubled industrialism with such a surplus of products that replacement is now more efficient (on a per unit rather than holistic basis) than repair.
THE BRIEF THEN

The challenge for design, for the design of more sustainable societies, is therefore to design for sustainment, design as sustainment. But this will require that design dispense with the technical focus on completed products. It will require that design be more receptive to incompletion, to products-in-time, to things changing, in ways that cannot be pre-empted.

An a\textit{techni}cal design of PSSs, working toward the longer, and therefore less materials intense over time, use-lives that only servicing and repair can grant, cannot involve the projection of complete schemes. The designs must instead always be conceived and realised as something that will forever need completion, a process that the designer must facilitate but not certify. And when those moments of redesign are needed, designers must respond to these \textit{phúsical} resistances with a different disposition, one that seeks not to refix what appears incomplete, but rather work with the changes that are part of something's completeness, and are therefore changes that will occur again. These broken-down things must not, because they cannot, be rectified or restituted. Design must find ways of fostering them in their changed condition, their new oldness.

Without going any further, a hint for what this might mean lies, I believe, in the metaphors of cultivation or shepherding.\textsuperscript{xxxii}

DESIGN’S PRODUCT FIXATION

This is a substantial challenge that goes against the very nature of designing. As indicated at the beginning of this paper, over 25 years of ecodesign has failed to dispense with the \textit{techni}calities of producing once-and-for-all per unit products, and Rebound Effects are the consequence. Perverting Jurgen Habermas, one might also say that the over-75-year project of modern design with regard to functionalism remains incomplete because of the persistence of the \textit{technique} of completing things. Or, in the word of Bruno Latour, we have never been modern, since we remain transfixed by the objects of Ancient Greek \textit{techné}.\textsuperscript{xxxiii}

I do not have time to substantiate this point, but initial surveys certainly suggest that most of the more radical advocates of broadening the scope of design still centre the process of designing on completing things, without any reference to how those things persist and mutate after completion. At best those seeking to change design follow Buchanan in seeking enlarged fields of operation, but such Fourth Order designing is not yet designing in the Fourth Dimension of time.

These instances manifest wider issues about what motivates modern \textit{homo faber}. For the Hegelian Marx, it is axial to modern humans that they make finished products that, in their independent objecthood, can attest to the subjectivity of their then alienated creators. Nuri Bilgin, in the article to which Moles refers, points out that maintenance tends to work against certain psychological theories that argue that ‘any motivation toward completing a task engenders tension, which is usually relaxed only when the task has been accomplished. Now, since prevention is carried out without perceptible stimuli and without a direct goal, this state of tension persists, and the preventive action may bring about permanent frustration’ (129). Both Marx’s and Bilgin’s points are affirmed in one of the few English philosophies of making (or more exactly the many ways of speaking about making), Andrew Harrison’s \textit{Making and Thinking} (Harrison, 1978).\textsuperscript{xxxiv} And much of the productive work bringing Activity Theory to an understanding of the design process reaffirms the ‘focusing’ power of making the object of design processes an object (eg Houkes et al, 2002).
LEARNING TIME

If this objectivism is ingrained in design, then it is design education that is rubbing it in. While there has been considerable progress in the development of process-based assessment, most design education activities still centre on the production of completed objects: essay, posters, prototypes; each has, as it must, the finishedness of the technically made. Is it not here that designers are being inducted into an addiction to stand-alone, once-and-for-all objects? Is this not a fundamental obstacle to the cultivation of designers more adept at facilitating the maintenance, repair and modification of what they bring to presence?xxxv

Alexander Sidorkin begins an intriguing essay on ‘The Labour of Learning’ (Sidorkin, 2001) noting that ‘A teacher friend of mine jokes that whenever it is time to throw away his student’s drawings, he feels guilty, as if the god of children was watching disapprovingly. Every teacher can probably share this sentiment. It is a sad moment in teaching when the cute and awkward things children produce end their short lives’ (93). From this familiar yet ‘ignore[d] on a theoretical level’ scene, Sidorkin asserts that all education, not only design education, ‘is largely a function of making things; it is a consequence of making something’ (93). In particular, ‘Learning is the production of useless things. The things that students produce while learning are never being consumed; no one needs them. In contrast to utilitarian production, learning can be defined as wasteful activity’ (93).

Without taking up Sidorkin’s polemic against progressive education’s desire to make all making-for-learning also useful, the article captures the extent to which learning, especially the learning of design which is proudly making-based, is thoroughly technical, producing things that are at an end after being made, without even a use-value. Here is the very opposite of learning to make things that need to be remade. And the pile of uncollected products forever accumulating outside my office attests to this.

So, in conclusion — but this proposal is something that now needs to be developed, both theoretically and in practice — I would suggest that design education involve, not no making, and not the making of more useful things, but the remaking of things. Students should retrieve work from one semester and take it further the next, learning to perceive the inadequacy of what was submitted at one time, and the potential it retains to be refurbished and modified. This would be enhanced if students were required to recover other students’ work and make it their own through repairs. Such retrievals and recoveries, such exposure to unfinishedness, would open their technical competencies to more phüsical prudence, and thereby dispose them to the cultivation of sustaining-PSSs, or sustainments.
References


Cooper, T. (2000) Products to Services Centre for Sustainable Consumption, Sheffield University; available at: www.foe.co.uk/resource/reports/products_services.pdf


Reijnders, L. ‘The Factor X Debate: Setting Targets for Eco-Efficiency’ Journal of Industrial Ecology v2 n1

Retrepo, Hristiaans & Rodriguez ‘The Finality Argument on Design Methods: A Theoretical Approach from the Social Sciences’


Sidorkin, A. ‘The Labor of Learning’ Educational Theory v51 n1 (Winter 2001)


Responsibility Tellus Institute for US EPA Office of Solid Waste


ENDnotes


ii Designers like Victor Papanek, with a background in ‘appropriate technology’ and ‘socially useful production’, were developing and promoting ecodesign before this time, but Bruntland’s report is generally taken as the mainstreaming of environmentalism. The issue of work on sustainability before and after this date will arise below.

iii ‘Rebound Effect’ is an economic term referring to i) increased spending on a product or service as a result of price reductions (the new air-conditioner or heater is more energy efficient and so cheaper to run, so users feel more comfortable about leaving it on for longer), or ii) ‘respend elsewhere’ as a result of price reductions (savings on the energy bill as a result of the more energy efficient air conditioner or heater are reinvested in an extension to the house, adding another room to the heating/cooling load). Rebound Effects also occur on the production-side: if more efficient production techniques allow a factory to produce the same number of widgets in 6 hours as used to take 8 hours, the factory will not close earlier each day, but instead produce 25% more widgets). Importantly, Rebound Effects can also be cultural: lightweighting packaging is an eco-efficiency strategy, but it also tends to lessen a user’s guilt about disposal after a short-use-life, accelerating overall materials throughput. An example closer to the topic of this paper is equipment hire: using a leased lawn mower allows one product to serve many users, but lack of ownership can mean less care is taken in use, undermining the product’s overall use-life.

iv Tony Fry for some time has been characterising DfE as ‘sustaining the unsustainable’, in other words, reducing the ecological damage done during the production of products whose use enables ongoing ecological damage (Fry, 2003). Mainstream DfE is now differentiating ‘doing [the same] things right’ from ‘doing the right things’. According to Ezio Manzini, a product is only sustainable if it puts in place a more sustainable system of needs fulfilment (Manzini, 2003).

v There has been much work on ‘cultural change’ (see for example the Fostering Sustainable Behaviour website (www.cbsm.com) and the Tools of Change website (www.toolsofchange.com), but this work remains distinct from DfE. The result tends to be an either/or: either make the built environment less damaging without changing existing lifestyles, or change lifestyles without substantially changing the built environment.

vi The increased complexity of multi-functional devices invariably reduces their use-lives, either because they are expensive to disaggregate when needing repair or because they are too complicated to use in the first place. I am always reminded of the illustration of a student’s design for an all-in-one device that Donald Norman includes in his classic The Design of Everyday Things (1990: 32).

vii Though the point of this paper is to argue that despite at least a decade of strong work on LCAs, the whole-of-life perspective of LCAs is yet to permeate the sensibility of designers, let alone consumers. On this see Heiskanen, 2000.

viii For a creative take on this argument see the stimulating work of Eternally Yours (van Hinte, 1997) and the important paper by Verbeek & Kockelkoren, 1998.

ix Though Martin Charter’s Centre for Sustainable Design has been promoting the acronym 3S (Sustainable Services and Systems), consensus, at least in the EU, seems to be falling on PSS: see www.pss-info.com and www.suspronet.org.

x Manzini et al. (2001) and Cooper (2000) have made clear that there is no such thing as a product-less service,
however Walter Stahel of the Product-Life Institute has argued for some time that all products should be considered ‘service delivery mechanisms’.

xi As opposed to more American initiatives in this area, following the work of Hawken, Lovins & Lovins, 1999 and White, 1999.

xii I do not mean to single out Morelli. The situation is the same with Tracy Bhamra and her colleagues at Cranfield University: Bhamra et al., 2001; Argument, Lettice, Bhamra, 1998; van der Zwan & Bhamra, 2001. Whilst noting that ‘the development process for generating an ‘alternative’ [function fulfilment] solution is likely to be different from the product development process that is in place’ (van der Zwan & Bhamra, 2001: 4), the language that follows refers only ever to ‘extra aspects’, such as briefs that allow ‘more design space’ (4). When it is acknowledged that ‘through this increased design space, the design processes themselves will change as well’ (4), the latter is defined still as ‘different tools and techniques’ that deliver ‘an ‘alternative’ solution’ (4) based around the ‘restructuring current product offers’ (5).

xiii This connection is made in Oksana Mont’s report on ‘Functional Sales’, 2002.

xiv ‘The logical outcomes of the above propositions [extrapolated from Moholy-Nagy’s pedagogical theories] also will point to the same end result, i.e., the vanishing of the product as the main target of design… push[ing] material artefacts to the background in favour of the actors within the system’ (Findeli, 2001: 14). I should note that much of this paper was inspired by Findeli’s profoundly insightful work on the history and future of design education.

xv Not that this is not the task of design. See Findeli, 2001.

xvi Though Moles does mention in an aside that ‘a technological civilization applying the comprehensive guarantee would noticeably reduce its consumption of raw materials in conformity with ideas expressed by the Club of Rome and by some ecological movements’ (Moles, 1985: 59-60).

xvii This notion reminds me, despite the severe disparity in contexts, of Alexander’s concept of ‘repair’. In Banham’s Aspen Papers, Alexander advocates what might be called ‘design for continual fine adjustment’ (Alexander, 1974: 93). In A Timeless Way of Building (1979), Alexander differentiates the ‘patching, conservative, static’ type of repair, returning things to their ‘original state’, from one that assumes ‘that every entity is changing constantly’, in which case repair is ‘creative, dynamic and open’, transforming what is being repaired into ‘new wholes’ (485). Alexander’s notion seems to be compatible with Morris’ polemics about conservation architecture: on this see Harrison’s discussion of Morris in Harrison, 1978: 107-117.


xix By ‘Modern’ I mean the Frankfurt School, especially Marcuse, and his influence on the more pessimistic of the American pragmatist philosophers of technology, such as Langdon Winner, via Jacques Ellul.

xx There are a number of powerful promotions of phronesis over the imperialism of rational techniques. See for instance Joseph Dunne’s seminal Back to the Rough Ground (1993) 2001, and Richard Bernstein’s Beyond Objectivism and Relativism (1983) both of which take their inspiration from Gadamer, but also, for a more recent example, the work of Bent Flyvbjerg Making Social Science Matter (2001).

xxi Hannah Arendt’s whole philosophy has forcefully diagnosed the dangers of trying to make, technically, communities — though her lessons have certainly not yet been learnt: see Arendt, [1958] 1989.

xxii With specific reference to sustainability, see Flyvbjerg, 1993. In the context of design, see Nelson & Stotlerman 2000: ‘Design skills and methods, including research, grounded in technical rationality remain important to any process of design education but there are some important additions. This is due to the fundamental difference among the types of knowledge where the outcome is an externalized artefact (concrete or conceptual), and the type of knowledge that evokes the right kind of outcome for the right people, at the right time, in the right place, for the right reasons, in the right measure’ (32). All these ‘right’s clearly signal the non-generalisable phronic quality of design as a service, and by corollary, the design of services.

xxiii This is the standard design studies account of the origin of the design: the division of labour brings into being the self-consciousness of prefigurative designing: see Jones (1992) and Alexander (1971).
In addition to the work of Donald Schön, there is also the work of David Pye and Peter Dormer. This can be seen as part of wider ‘(re)turn to practice’, especially in the constructivist education of people like Jean Lave and Etienne Wenger: see also The Practice Turn in Contemporary Theory (Schatzi, K., Cetina, K. & E.von Savigny (2001)).

One amongst others who make this argument is Alain Findeli, 1994.

This is what Arendt calls ‘Action’. Its phüsīs-like entelechiāl nature is best captured in terms of Arendt’s commitment to life-stories; each of us lives a story in which every today could simultaneously be our concluding chapter and the first chapter of a whole new section. See Section 25, Chapter 5, ‘The Web of Relationships and the Enacted Stories’ in Arendt, [1958] 1989.

The translator notes (162) that the play on the stem ‘deed’ (Tat) cannot be translated, but it can, if one remembers that facere is ‘to make’.

Translators note (163): ‘Gegenständlichkeit — not to be confused with Gegenständlichkeit (objectivity)’

I am writing this on the evening of the Spaceshuttle Columbia disintegration.

The reference here is to the first line of Robert Frost’s poem ‘Mending Wall’: ‘Something there is that does not like a wall’: Lathem, E. ed (1987) The Poetry of Robert Frost [Henry Holt Publishing], 33.

This is one of Heidegger’s many ways of translating the ‘Anaximander Fragment’.

See Manzini’s sustained advocation of an ‘ecology of the artificial’ or ‘the garden of objects’: Manzini, 1995.

This is more than gest, since Latour’s promotion of the ‘hybrid’ clearly signals the interdependence of humans and their things, each having to sustain the other.


One of the biggest barriers that students need to overcome when first participating in design studios is the showing of incomplete work to teachers and peers. Herein lies another strong opportunity to inculcate designers into a more time-aware designing.

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