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Abstract: This paper presents a critical examination of the current state of design by exploring a number of paradoxes – sustaining the unsustainable, disciplining the undisciplined, reconciling future visions with harsh realities, and others. We suggest that whilst design researchers have been probing design, it is highly likely design might never have been where they were looking. Consequently, this paper presents a 6 point manifesto for design research where the emphasis is on acknowledging our material and energy flows and their environmental impact, a more critical stance in design culture that will reveal contradictions, rock the boat, critique 'what is' to 'what could be', and contest the legitimisation of power. Moreover, design must strive to maintain care for details and quality of public service in everything we do whilst having a concern for otherness and visuality, which privileges thinking in terms of images over numbers and texts, and an interest in theory.

Keywords: Reversification, Design Research, Paradoxes, Not Knowing

1. Introduction

This paper presents a critical examination of the current state of design thinking by exploring a number of paradoxes prevalent in contemporary design. The paper proposes that whilst both design researchers and design thinkers have been probing various aspects of design, it is highly likely that they have been looking in the wrong places. Consequently, this paper presents another way of thinking about design where the emphasis is on understanding how little we know and recognising that the unknown is a necessary and welcome condition for the beginning of any design research pursuit. That is, as designers of any persuasion we should focus on what we don't know (Hara, 2015) and move away from current forms of design that largely results in imitation and derivation. Today, there exist a number of significant paradoxes in contemporary design thought and practice. For example, sustaining the unsustainable, disciplining the undisciplined, reconciling future visions with harsh realities, and many others. Over the period where design has been probing design, it is highly likely whatever is recognised as design might never have been where design has been looking. In trying to cast light on this world, John Lanchester recently coined the term "*reversification*", and what he means by this term is "*a process by which words take on a meaning that is the opposite of,*

or at least very different from, their initial sense" (Lanchester, 2014). Taking a close look at the culture of how we think about what we call design, it appears to epitomise the process of reversification so now its terms mean something very different to their initial intentions. In this critical paper we will rethink this reversal and discuss the impact on the capacity of design to shape a future in which we will all want to live and share.

Design needs to acknowledge that it has contributed to the creation of a world that nobody really wants. We are destroying some of the most important features of society that we claim to hold most dear (*i.e.* our planet wherein we continue to deplete and degrade our natural capital on a massive scale, our society where nearly 2.5 billion people on our planet live in abject poverty, and our spirit where, according to World Health Organization (WHO) statistics, 3 times as many people die from suicide as die from homicide or in wars. These crises also manifest themselves in many other forms including rapidly growing figures for burn out and depression that collectively create results that nobody wants and constitute the most significant failure of our time. Given the current situation, this paper will present a number of contradictions in design thinking that typify the contemporary complex challenges that we face. The following sections of the paper present seven paradoxes that typify the contemporary complex challenges that design now faces. These paradoxes are evidence of our failure to design coherent and appropriate systems and strategies for the interconnected and complex socio-technical challenges across the world. As such, the paper critically examines design research and the inherent tensions that exist for the potential of design thinking to address the planet's most urgent challenges. The factory of knowledge, more commonly called the Design School, has steadily invested in the reversification of the ways we have become used to explain to ourselves what we are doing, meaning we now do not know what needs to be done. Or paraphrasing a remark attributed to Michel Foucault – we may think we know what we do, but we do not know what we do does.

2. As a Discipline Design is Really Undisciplined

In today's paradoxical world, the idea of disciplined design is ridiculous. Admittedly, universities and colleges have stuck firm to disciplined silos for many years, but these are largely arranged to maintain clear management of resources such as staff, equipment, and materials. Design in practice – in the commercial realm and elsewhere – sees no boundaries between so called disciplines such as product design, furniture design, graphic design, interior design, and so on. This is hardly a new phenomenon. Some of the early, great pioneers of twentieth century design including Christoper Dresser, Raymond Loewy, Charles and Ray Eames, Ettore Sottsass, and Alessandro Mendini consistently transgressed so-called design disciplines (Hauffe, 1998). Today, designers do not work within strict disciplines and, perhaps necessarily, transcend many conventional disciplinary silos. Designers no longer reside comfortably in categories such as product design, furniture design and graphic design. Indeed, it has been claimed that: "*New hybrids of design are emerging. People don't fit in neat categories; they're a mixture of artists, engineers, designers, thinkers. They're in that fuzzy space and might be finding it quite tough, but the results are really exciting.*" (West, 2007). This statement is hardly a grand revelation, however. Design has always been viewed as a bridge between technology and art (Flusser, 1999). This point is further embellished by Alex Coles in his recent study of the "Transdisciplinary Studio" (Coles, 2012). In Coles' work, he points out that: "Artists and designers are now defined not by their discipline but by the fluidity with which their practices move between the fields of architecture, art, and design." Coles' book examines 4 pioneering transdisciplinary studios - Jorge Pardo Sculpture, Konstantin Grcic Industrial Design, Studio Olafur

Eliasson, and Åbäke who all typify undisciplined creative practice that moves seamlessly between historic and outdated disciplines (Figure 1).
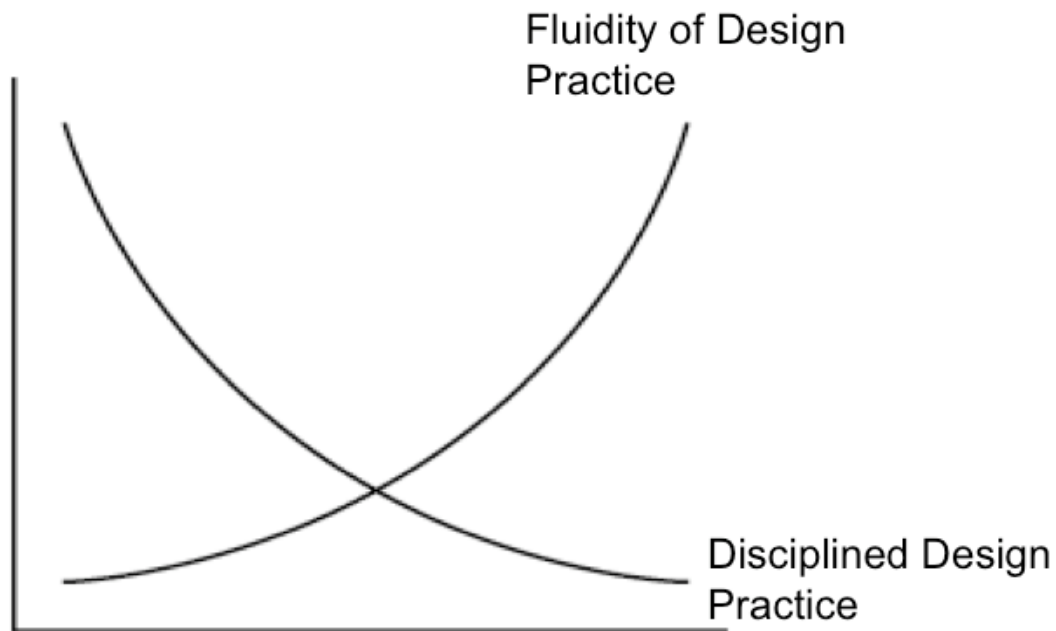

Figure 1. The Paradox of Disciplined Design

Globalisation and the proliferation of the digital has generated other dimensions so we might now need to consider design as "undisciplined" or operating in "another disciplinarity" as the most effective focus for design research. Given the huge escalation in the power and availability of digital technologies in enabling creative expression, designers are rapidly turning into polymaths who are capable of working across many conventional disciplinary borders (Seymour, 2006). It has further been suggested that we are entering "a new Renaissance" period where individuals' capacity to mix technical and creative knowledge like Leonardo da Vinci will become more commonplace (Gehry, 2008). Creative workspaces increasingly resemble scientific laboratories; contemporary creation increasingly makes use of new digital design and production technologies across fashion, performing arts, cinema, music, videogames, architecture, and design in a cut and paste "mash up" evidenced in Coles' study of the transdisciplinary studio practitioners and many others such as Takashi Murakami, Ross Lovegrove, Atelier van Lieshout, Hella Jongerius Studio, and Greyworld. As such, this "other" dimension or "new Renaissance" way of working requires knowledge and skills from several areas including art, design, computer science, engineering and business. The paradox here is that design as a disciplinary pursuit is moribund. Undisciplined creative practice, based on new ways of working and new methodologies in an inventive "mash up", typified by fluidity where research moving across fields such as architecture, art, and design heralds the way forward. The discipline of design reverses its syntactical meaning to become the design of discipline, where discipline controls behaviour and the makes sure the rules are obeyed. That is, the discipline does the disciplining and any research into the discipline is subject to discipline.

3. The Easier it Becomes to Design the Harder it is to Design

We are constantly reminded of the ease nowadays of turning our future visions into real products. Personal fabrication systems, it is claimed, give us all the ability to design and produce our own products from the comfort of our very own homes, which will revolutionize the world (Gershenfeld, 2007). Vast technological developments in computing and manufacturing have led to conditions such as agile manufacturing (e.g., using affordable machines like 3-D printers, laser cutters, and small CNCs), low production costs and rapid execution cycles mean it is relatively simple to turn ideas into finished objects ready to be distributed all over the place. Joi Ito, the director of the MIT Media Lab, has coined the phrase - 'Deploy or Die' precisely to encourage researchers of the MIT lab and elsewhere to exploit these technological opportunities and to push their projects up to the production stage and beyond the creation of a demo version (Rowan, 2012). However, we should take greater care with design and heed the warning from Dieter Rams - arguably one of the greatest designers of all time – that design is far from easy (Figure 2).
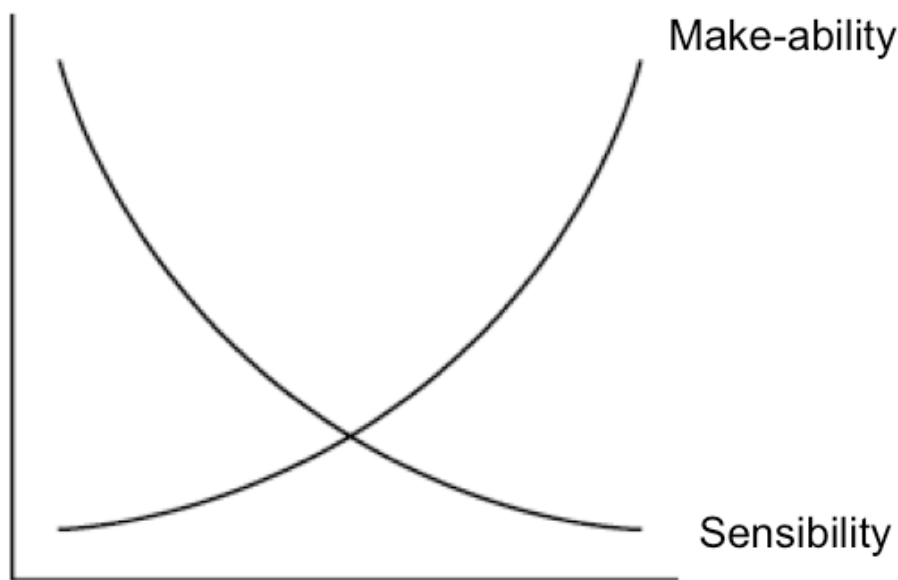

Figure 2. The Easier it becomes to Design the Harder it is to Design

As a signatory to the "The Munich Design Charter," published in Design Issues in 1991, Rams knows very well design's responsibilities in all parts of contemporary life. It is unfortunate and depressing that, now, 20 years later Rams needs to remind us again "…*that design is a serious profession, and for our future welfare we need to take the profession of design seriously….*" (Rams et al., 1991). With the emergence of the mass makerspace economy in an era of production without products mass-produced by immaterial labour, whatever value that design research had sought to add to what we know needs to be reversed to search for the sensibility in what we don't know.

In recent years we have witnessed a significant increase in collective design and fabrication shops. These are more commonly known as hackerspaces, makerspaces, Fab Labs, TechShops, co-working spaces, accelerators and incubators. Official estimates claim there are over 700 Fab Labs in the world

(www.fablabs.io) – although this figure is likely much higher given the number of private and informal maker spaces that have cropped up in recent years. Despite the marketing hubbub of the "maker movement", these shared design and fabrication spaces are currently "fringe phenomena" since they play a minor role in the production of wealth, knowledge, political consensus and the social organisation of life (Maxigas and Troxler, 2014). Shared design and make spaces are not a new phenomenon. Before Fab Labs came on the scene, the movement for socially useful production during the Thatcher era in the United Kingdom existed, as did the technology networks of the Lucas Aerospace Company in the USA. Maxigas and Troxler (2014) highlight that, contrary to the much-hyped democratic design and make movement, Fab Labs are not about technology, sharing is not happening, and Hackerspaces are anything but open to all. Sophie Toupin's research highlighted the plight of "hacker/maker/geek women" who decided to make their own maker spaces out of frustration with the politics of openness – or in other words, the practices of exclusion – in mainstream hacker spaces (Toupin, 2014). Also, a lot of the technology employed in maker spaces is anything but neutral. Hackerspaces are not solving any problems, and the oft-heralded Fab Labs are not the seeds of a democratic design and make revolution.

4. The Claim that Good Design Equals Good Business has Impoverished Design

Given that global debt now stands at $US200 trillion – three times world GDP (Mason, 2015) – in order to understand good business, balance sheets are futile. Having abandoned the goods that illustrated balance sheets business has settled on the operations of algorithmic super-fast traffic in the cache of ungovernable shadow banking and expects design to churn out innovation. That is, design that is good is now indebted to development strategies that guarantee the possibility of new products that are real, but also products that are no longer definitive, to fuel what Boris Groys describes as "production without a product" (Groys, 2012). In this murky world of capital, where "financial abstraction does not discriminate criminal money from any other kind" (Berardi, 2016: 1), the mantra of the profitable relationship between design and business is persistent, as the Design Council regularly trumpets "Headline figures from Design Council's new research The Design Economy were released yesterday, showing that design contributes £72bn to the UK economy (7.7% of GVA). Design as a discipline benefits and cuts across the whole UK economy, rather than a single industry." (Coldrick, 2015). And the trenchant critiques that oppose this perennial boosterism have been ignored for a long time. From Reyner Banham "The concept of good design as a form of aesthetic charity done on the labouring poor from a great height is incompatible with democracy as I see it." (Banham, 1960). Ken Garland's First Things First manifesto (1964) gallantly criticised design's business acumen only to be reprised naively in 2000 with the spate of manifestoes envisioning a New World post the fall of the Berlin Wall and the triumph of democratic capitalism it's fall was purported to symbolise. The critical tone was ramped up by Patricia Conway, who wrote in Design Quarterly that design was "*…an almost criminal exercise in greed, negligence and wilful destruction.*" (Conway, 1973: p.5). It would appear that over fifty years ago design was alerted to the perils of its pact with business resulting in a treadmill of innovation, while its flair for business had also reversed its fortunes and impoverished its expectations (Figure 3).
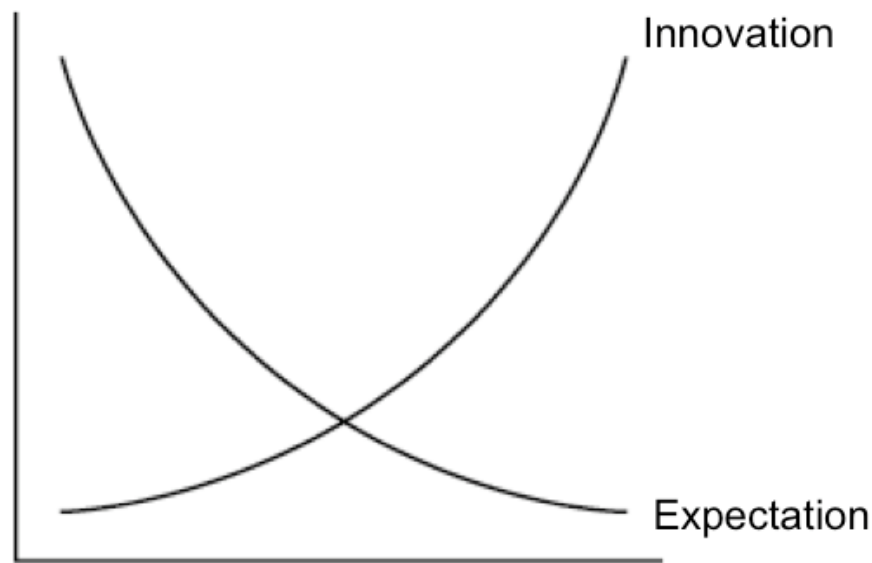
The impoverishment of design

Figure 3. The Impoverishment of Design

5. Any Originality Claimed by Design is Really Derivative

That the existence of design is contingent on the 'financialisation' of the global economy is hard to dispute. The run of finance forms the trickle of design. However all exchanges in the financial sector are being designed for a financial 'instrument' the sector calls the derivative – a term from calculus describing the ratio of change between two variables – one independent and the other dependent. Even in the capital project understanding the derivative has become tricky because "derivatives are assets that embody the risks of the rise and fall of underlying assets, which may themselves be derivative in nature". (Appadurai, 2015: 230). The general impression is that the derivative is a form of insurance against change—change up or down in a share price. For the field of design, premised on the projection of possible future scenarios, to contract its fortune to finance based on insuring against change is potentially a terminal covenant. And having to depend on a financial 'product' called the derivative does not look good for design – a field characterised by some form of original novelty (sometimes erroneously called innovation) not some form of derived imitation. But design does not just depend on the derivative. Design, as we know it, does not exist. In the current financialised world the chain of derivatives turns virtually everything into linkages so design now exists to forge links for the derivative. Design might think it is an independent variable but it is clearly dependent on the variable of capital so design is derivative (Figure 4).
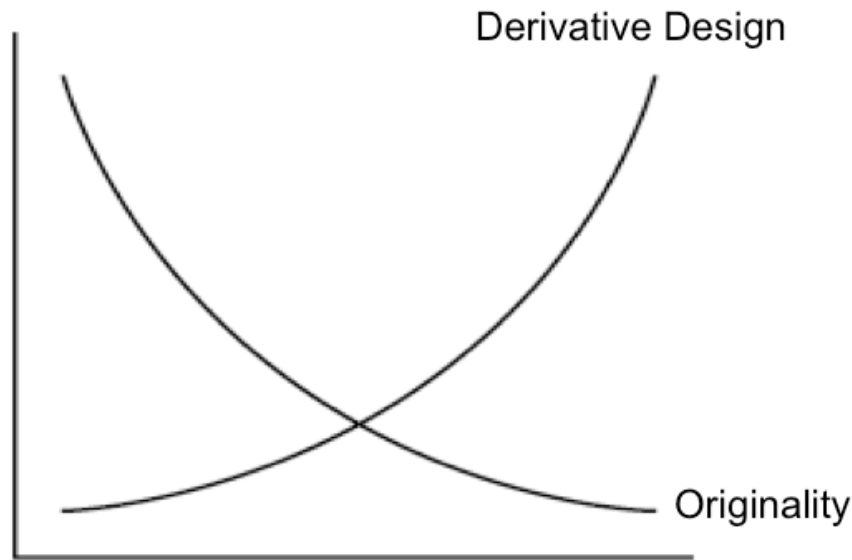
Figure 4. The Paradox of 'Original' Design

6. The Usefulness of Design Research Resides in its Uselessness

A generation ago Alessandro Mendini wrote a typically cryptic essay entitled "*The Utility of Uselessness*" in Modo magazine (he was the editor at the time) concluding with this sentence "*It is useful to think of the uselessness of the useful*", which serves as a useful reminder to rethink the usefulness of design research (Figure 5). Provided it is agreed that the superficial search for difference is not considered research, then throughout the history of the practice of design the process called research has in general been classified as useless. In the hands of most practitioners, design is useful and research is useless – producing the situation in which form triumphed over content creating a century of imitation that has depleted any usefulness design might have had. If design were to swallow Mendini's bitter pill it might be useful to think of the uselessness of where and when it had been useful; when design signed up to the seemingly utopian project of imagining a better world on the one island we share. Design has certainly made a better world, but only for those who already own it (now called the 1%) for which Mendini might have written 'it is useless to think of the usefulness of equality'. By contrast, when it comes to design research, for most of its existence seen by design as useless in its service to liberal capital, it might be useful to consider how useful that uselessness really is. That boils down to one question – can design research help extract design from its Faustian contract with capital (see Good Business below)? This isn't one of Rittel's wicked problems. It is an example of Žižek's unknown known (Žižek, 2010) – something we don't want to admit we know. Design has always been polishing the surface of liberal capital but design research has been deemed useless because it has been scratching at that same surface trying to find relevance by doing something useful like responsibly addressing societal problems. On a populous planet manifesting its limits it is possible that the apparent uselessness of design research might now be useful provided it reverses its investigation into the material of design and investigates the labour of design, which is now immaterial.

The utility of uselessness
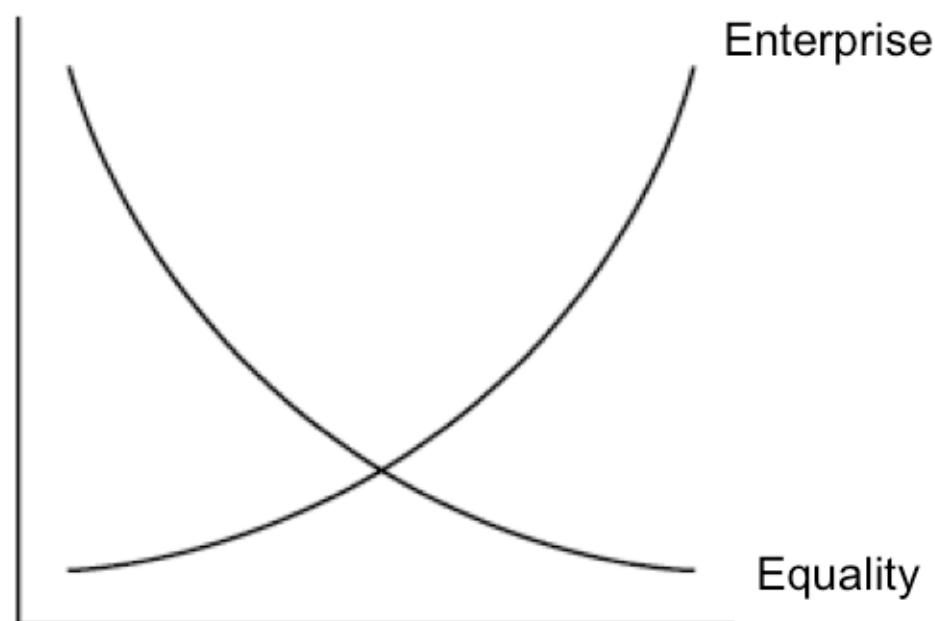
Enterprise

Equality

Figure 5. The Paradox of Utility

7. The Claim by Design to be Responsible is Irresponsible

Earlier parts of this paper have illustrated how the disciplinary nature of design has dissolved. Similarly, as the global problems of the 21st century are increasingly complex and interdependent and they are not isolated to particular sectors or disciplines we argue that design needs to be "undisciplined" in its nature or as Mitchell terms it "indisciplinarity" (Mitchell, 2009). Furthermore, there might even be a need for the designer to be "irresponsible" because we know that we need more playful and habitable worlds that the old forms of knowledge production are ill equipped to produce (Marshall and Bleecker, 2010). Moving towards an "undisciplined" and "irresponsible" design in an age of "alterplinarity" (Authors, 2011) requires an epistemological shift, but this will in turn offer us new ways of fixing the problems the old disciplinary and extra-disciplinary practices created in the first place (Figure 6).
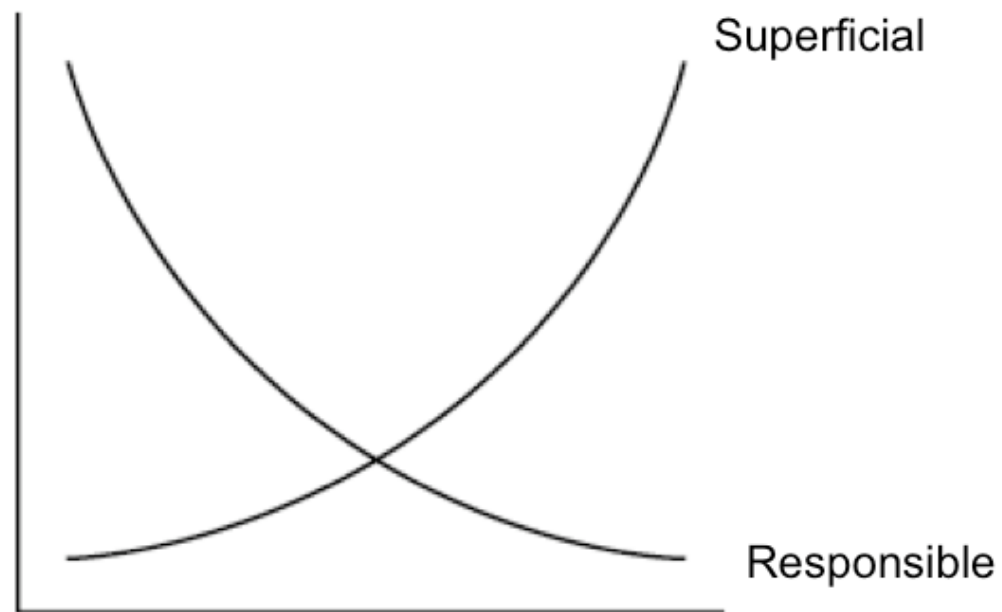
The paradox of responsible design

Figure 6. The Paradox of 'Responsible' Design

The primary function of design research is to make us better designers, and generally better informed about the possibilities and limitations of the subject that is design. Moreover, if what we call design is now best described as a superficial instrument in the alter-modern project, it is easy to see why the academy might be concerned about its research outputs in this contaminated territory. Instead of audited research we counter-propose "undisciplined" research requiring someone we call the "irresponsible researcher", who is someone finding their own way through the slush of what were once the design disciplines, and for whom not knowing is an invaluable aid to getting through it. Also, not knowing is important because the core framework can only be assembled as a temporary platform for each projection and should never become a platform that we say we know and can omit because it is known. As Dilnot (2009) describes, research referring to knowledge of a history of design is few and far between (in fact eschewed to clear a space called the future). Moreover, the absence of an understanding of why the trajectory of the here-and-now is the basis of what-might become has tended to lead to a dependence on methodology to construct a platform for the projection of what-might-not-become or serial reproductivity. Again this dependence on method is symptomatic of a field in crisis (Law and Urry, 2004), which can only be confronted by the irresponsibility of not knowing.

The fragmentation of distinct disciplines, including those located in traditional art and design contexts, has shifted creative practice from being 'discipline-based' to 'issue- or project-based' (Heppell, 2006). This shift has emphasised and perhaps encouraged positively "irresponsible" practitioners, who purposely blur distinctions and borrow and utilise methods from many different fields. Design research, therefore, has shifted from being 'discipline-based' to 'issue or project-based', and undisciplined and unknowing practitioners will be best placed to make connections that generate new methods and to identify 'other' dimensions of creative research, practice and thought that is needed for the contemporary complex and interdependent issues we now face. Without

discipline, design research is now defined not by method but by the fluidity with which it operates between creative and other historical fields.

8. Design's Devotion to Sustainability is Unsustainable

Ezio Manzini's "Changing the Change" conference for designers in 2008 was based on two main ideas, which he called optimistic-realistic:

"The first is that the change in progress towards a society that calls itself network and knowledge based, yet is still as unsustainable as what we had before, if not more so, can be re-oriented towards sustainability. The second is that the designer community can play a positive role in this necessary re-orientation and that this can be done by building new design knowledge." (Manzini, 2009: 4).

What Manzini's optimism conceals is design knowledge from 1972. In that year the Limits to Growth study argued that continued consumption of resources at the current rate was unsustainable. To support their ground-breaking study the authors designed a computer model called World3, which simulated interactions in the key subsystems of the global economy: population, industrial capital, pollution, agricultural systems, and non-renewable resources. Despite over 40 years of concerted effort to discredit their predictions, and an almost equal amount of time reorienting design towards sustainability, the predictions from 1972 appear to holding up. Their simulated modelling has been recalibrated recently, with far more advanced computing and data, by Dr Graham M. Turner, who is a Principal Research Fellow at the Melbourne Sustainable Society Institute, University of Melbourne, Australia. Turner asks "Is collapse likely, and imminent?" and in his answer he has to confess:

"Based simply on the comparison of observed data and the Limits To Growth scenarios presented above, and given the significantly better alignment with the Business As Usual scenario than the other two scenarios ('comprehensive technology' and 'stabilising world'), it would appear that the global economy and population is on the cusp of collapse." (Turner, 2014: 9)

Turner also has this to say about the general trend of technological positivism (pervasive in design thought and action) "that successive attempts to solve the sustainability challenges in the World3 model, which lead to the comprehensive technology scenario, result in even more substantial collapse."

A fairly well accepted definition of sustainable development is 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (World Commission on Environment and Development, 1987: 43). The paradox for design is that it has to confess that its pursuit of a sustainable future relies on concealing from itself that what it is generating is already unsustainable (Figure 7).
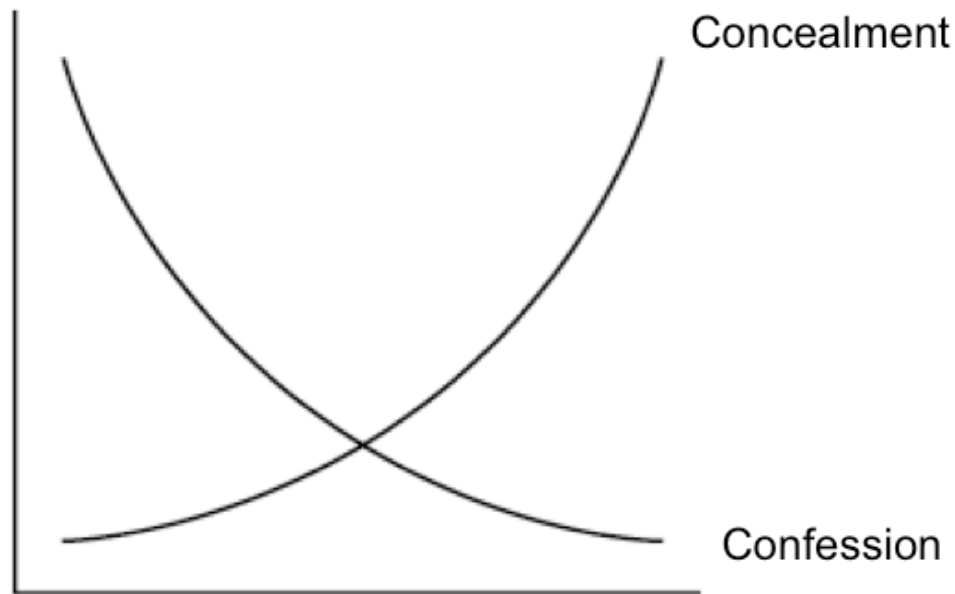
The ignorance of design

Figure 7. The Ignorance of Design

9. Conclusion: Rethinking Design Virtues

John Lanchester revealed that money speaks in reverse meanings and the dependence of design on this money has reversed the meanings once attributed to design. As a way forward for design research, the authors propose a 6 point manifesto for the condition contemporary design finds itself in based on earlier work (Authors, 2011). That is, a situation where evolving muddles of practice alters conventional disciplinary boundaries and creates new terrains of creative opportunities. The manifesto acknowledges the mess of contemporary thought and action in the multitude of design research manifestations. Our manifesto is loosely based on Gui Bonsiepe's, the German designer, teacher and writer, 1997 lecture "*design beyond Design*" presented at the Jan van Eyck Akademie. Bonsiepe proposed six virtues for design based on Italo Calvino's "*Six Memos for the Next Millenium*". Bonsiepe saw parallels between literature and design. For example, in Calvino's definition of "Lightness" as the attempt to remove weight from the structure of stories and from language, lightness in design is a virtue to maintain especially when we reflect on material and energy flows and their environmental impact as well as the congested digital trash that permeates our being. "Intellectuality", Bonsieppe's second virtue of design, calls for a more critical stance in design culture. That is, design and writing about design should no longer be seen as sterile and mutually exclusive opposites. Rather intellectuality in design should reveal contradictions, rock the boat, compare 'what is' to 'what could be', and ask for the legitimisation of power. The third design virtue is concern for the "Public Domain" where we should strive to maintain care for details and quality of public service in everything we do from address labels to train timetables that ultimately reflects what kind of society we want to live in. The fourth virtue is "Otherness", or better *concern* for otherness where design and design discourse rejects the interests of the dominant economies that are engaged in the process of shaping the world according to their hegemonic interests and visions and bypasses the weary distinction between developed and underdeveloped nations and instead accepts other design cultures and their values. The fifth virtue is "Visuality", which privileges

'thinking in terms of images' over 'thinking in terms of texts'. Or, In other words, how a possible "Mode 3" design research approach might be best concentrated at the intersection between research and change, with a focus on mediating between actualities and potentialities (Julier and Kimbell, 2016). Julier and Kimbell's "Mode 3" way of working has similarities to Arias and Fischer's "Mode 2" research that is based on a context of application in response to the demand for solutions to problems from a community of interest. Here, communities of practice are made up of practitioners who work in a certain domain doing similar work; coming together to solve a particular problem of common concern. Members of communities of interest can learn from others who have a different perspective and perhaps different vocabularies for describing their ideas, and establish a common ground and a shared understanding (Arias and Fischer, 2000). Bonsiepe believes the move towards visualisation would benefit many including the way we practice and theorise subjects in the humanities, the physical and biological sciences, and the social sciences. The final virtue of design in the future is "Interest in Theory". Here, Bonsiepe claims that design theory must become part of our future educational programmes for two reasons. First, every form of professional practice occurs within a theoretical framework and second, professional practice that does not produce new knowledge has no future (Bonsiepe, 1999).

Contemporary forms of design research have been superseded by a condition where conventionally defined disciplines have been smashed. In this era where design research is typified by fluid, mutating patterns of practice that regularly stretch across, move beyond and transfigure historical disciplinary and conceptual boundaries, we posit that design research is no longer 'amid', cannot be measured 'across', nor encompass a 'whole' system. In short, this disciplinary turn has generated an 'other' dimension — an alternative disciplinarity - an '*alterplinarity*' we have described elsewhere (Authors, 2011). Moreover, design research's reliance on the 'exhausted' historic disciplines as the boundary of our understanding has been superseded by a boundless space/time that we call '*alterplinarity*'' (Authors, 2013). The fragmentation of distinct disciplines has shifted design research from being 'discipline-based' to what we would suggest is more appropriately defined as 'issue- or project-based' (Heppell, 2006). Consequently, this paper presents a 6 point manifesto for future design research where the emphasis is on:

1. Lightness in design where we reflect on material and energy flows and their environmental impact as well as the congested digital trash that permeates our being.
2. Intellectuality, which calls for a more critical stance in design culture. That is, intellectuality in design must reveal contradictions, rock the boat, critique 'what is' to 'what could be', and continually contest the legitimisation of power.
3. Concern for the Public Domain where we must strive to maintain care for details and quality of public service in everything we do that clearly reflects what kind of society we want to live in together.
4. A concern for Otherness that rejects the interests of the dominant economies (usually Western) that are engaged in the process of shaping the world according to their hegemonic interests and visions.
5. Visuality, which privileges thinking in terms of images over thinking in terms of numbers and texts.
6. An Interest in Theory where design theory must become part of our future educational programmes because every form of professional practice occurs within a theoretical framework and professional practice that does not produce new knowledge has no future.

In conclusion, design research needs to disrupt, contest, invent, direct, coordinate, respond, provoke and project future visions that we will all be happy to share. The complex and interdependent issues we face today need design researchers who will act in productively undisciplined ways. However, we must design and research with care and remember that, like design, the purpose of care is to affect the way we live. Finally, design researchers need to confront what most of them avoid – the past - and also accept that if design research no longer needs an idea, should design research still participate in the idea of design?

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