A research degree by practice, surely not?
A reflection upon my recent experience of constructing my successful PhD 'metathesis'.

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ABSTRACT

The proposition set out in the paper is that throughout the process of retrieving ideas a creative practitioner should endeavour to continue to think in a creative way. It should be possible to use a key skill of creative practice of drawing on a very wide range of ideas and flocking them together in a synergistic analysis. This skill set is one of the things that particularly sets industrial designers apart from others' intellectual attempts to engage with the problems and opportunities presented by the complexity of human–technology relationships. As designers, we have developed a number of strategies for resolving a degree of fluid complexity into rather simple applications. The techniques used in an industrial design project appeared to be an ideal means to come to terms with the implications of doctoral research. I propose that research should be (and can be) presented in that spirit as a form of practice, drawing together and testing in a synoptic manner an eclectic range of ideas. In that way, it might have some chance of coming together like a design solution. Ideas presented in this manner open the way for design research to regain its place at the centre, rather than the periphery, of intellectual debate in the design community.

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A PHD BY PRACTICE IN THE FORM OF A TEXT?

My PhD was supervised by Professor, Dr. Michael Punt, Robert Pepperell and Mike Phillips in Transtechnology Research - University of Plymouth: School of Computing, Communications and Electronics. I submitted my PhD on 28th February 2008, was examined by viva in mid April by Professor John Wood of Goldsmiths University and Professor Roy Ascott of Plymouth University. After completing some revisions I was awarded the Doctorate in September 2008.

My PhD identified ideas, paradigmatic of a number of emerging directions in contemporary thought, that can be characterised by their acceptance of the provisional as a means to a more complete understanding. Those ideas, accepting that closure is no longer a viable theoretical objective, worked together in a way that made it possible to discuss apparently unconnected topics and phenomena in a single conversation and to account for them as a single epistemic entity as a continuity of interacting essences. This was not a very typical or usual way to discuss industrial design.

I need a way of doing research that would be in a state of continual emergence, closer to the explosive poetic potentiality of painting than to a linear scientific reduction.

In its initial description, my PhD was intended to be 'by practice'. This was not something I was particularly comfortable with or sure that I understood. I have always taken industrial design to be a thoughtful and intellectual process of the imagination. The idea that 'making something' would in some way be considered to be different from 'writing something' seemed very troubling and seemed to miss the point. I am not entirely confident with the idea of a critical form of design practice as a research methodology. The 'point' of research seems to mean by implication that a question is answered or something is discovered or uncovered by the best means. My submission took a form that enabled a new kind of bringing together of hitherto disconnected ideas and the best way of doing that seemed to be by means of an entirely textual document. In the end this document totalled some 120,000 words – way over the maximum allowable word length for a submission by text. I maintained to the end that this textual document constituted a submission by practice; a piece of industrial design and the result of an industrial designers intellectual intervention in the world. That being said; I did put a large amount of the text into a coda as an appendix to the main text, thereby avoiding the need for a pedantic confrontation.

Since the problem identified in my research particularly identified with industrial designers, it seemed sensible to continue to think in the way that I had learned to think as an industrial designer. Thinking in that way would retain some sense that the research was an extension of a rather longer heritage,

although it might suggest some radical shift in intellectual approach. I realised that throughout the process of retrieving ideas I could only hope to endeavour to continue to think like an industrial designer, using the skills I had learned of drawing on a very wide range of ideas and flocking them together in a form of synergistic analysis. The easiest way to describe my submission for the PhD was 'textual thesis'. But that description would be profoundly inadequate. The 'thesis' was in effect a form of creative metasystem (Turchin, 1977) I have called this a 'metathesis' referring in an oblique way to the use of that term in organic chemistry (Gorzynski Smith, 2008. pp 1016-1018) to imply a form of a interactional recombination of component parts. New knowledge then is attained by the bringing together and synthesis of otherwise apparently unconnected fields.

$$AB + CD \rightarrow AD + CB$$
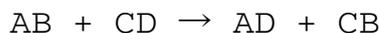
This is not as alien to the design process as it might at first appear. The complexity of design tasks means that individual industrial designers have to work with so many people, with so many techniques and in so many different ways that their expertise resides in both the clarity of their communication and the breadth rather than the depth of their understanding. This can make the industrial design community appear shallow. Unlike many of the specialists they encounter, an individual industrial designer must know something about almost everything. Individual industrial designers call upon a wide spectrum of knowledge and cross-reference it in a broad synthesising analysis in order to construct an outcome that seems to make sense. Individual industrial designers must be good at thinking differently and good at thinking as they act. The landscape in which designers work is constantly shifting, and so industrial design is invented somewhat on the hoof, such that designers have little time to reflect and require a fluid and exploratory method of analysis. Industrial design can rarely start with a clear question. In order to research, an individual member of the industrial design community can rarely engage in a simple literature review and then enact a study to arrive at some conclusion or other. The industrial design community finds itself enacted while it is operative, and is a bootstrapping process. While commentators can reflect upon shifts and changes in the dynamics of technological understanding across time, industrial designers are often at work in a competitive commercial climate, working as best they can and making the best of what they understand at the time. The industrial design community must operate within a network of imperatives; their intellectual placement is constructed by the need to liaise with and to win new clients, or with the need to get their outputs to price and to market. They must operate within a shifting field of changing tastes and styles and a global marketplace that does not always value intellectual insight and anticipation. Individual industrial designers should then be used to uncertainty and to the questioning of orthodox perception. Industrial designers, like other rational-minded people, are trained to seek closure and rational simplicity. They are particularly expert, however, at dealing with complexity and fluidity in their terms of engagement. Designers use processes such as sketching that 'talk' about the world in a fluid terminology while retaining some of the logic of closed and fixed materiality that forms the discourse of their community. This skill set is one of the things that sets industrial designers apart from others' intellectual attempts to engage with the problems and opportunities presented by complexity. In the case of industrial design this expertise tends at its best, to be applied to the complexity of terms in human–technology relationships. Designers have developed a number of particular strategies for resolving a degree of fluid complexity into rather simple applications. The techniques used in an industrial design project then, appeared to be an ideal means to come to terms with the implications of epistemic distinction in the human and the technological that particularly characterised my research. `So my thesis is a meta-thesis in the sense that` a wide range of ideas are brought together into a kind of constellation in which their interaction with other ideas creates a series of 'fusion reactors' where new ideas are produced.

A PRACTICE OF IDEAS

A trick that designers employ in order to solve problems is simply to reverse the terms of the question. This technique suggests that, rather than focusing attention upon ideas of transformation and otherness as much recent 'theory' promotes, the 'practising' designer should follow their instinct and look for continuity. In order to function efficiently, industrial designers have to know something about almost everything and in consequence they have become exceptionally skilled at flocking ideas together as a means of analysing and organising uncertainty, fluidity and complexity. I realised that, if my research could be presented in that spirit as a form of practice, drawing together and testing in a synoptic manner an eclectic range of ideas, then it might have some chance of coming together like a design solution. I therefore endeavoured to construct a form of synergistic design meta-analysis, combining the prosaic with the poetic, such that a picture could be presented that might have functional resonance with an audience both of industrial designers and of others who might be interested in how

people enact their lives through technologies. My premise was that I would know if I had been successful if those ideas could open the way for the industrial design community to regain its place at the centre, rather than the periphery, of intellectual debate – in its own terms.

In the 1960s Rittel, seeking an alternative to understandings of design as a systemic and structurally driven process, proposed the idea that design can be understood as series of confrontations of 'wicked problems'. Wicked problems are an acceptance of the indeterminate nature of the design process, and the resolution of 'a class of social system problems which are ill formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications of the whole system are thoroughly confusing' (West Churchman, 1967). Rittel's approach is just one derivative of 'Soft Systems Methodology' (SSM), building upon Optner's concept of the mid-1960s that a system can be understood as a series of sub-systems. There are any number of derivations of SSM, many of which have become systematic and formalised, but there is an analytical process that is used in science in order to study systems of massive complexity – for example, dust storms, gas flows or the flocking of birds – that bears some comparison with descriptions of the design process as a means of organising complexity.

Synthetic analysis is useful because it invites an understanding of complexity through a series of simple interactions. Auyung, a scientist at MIT, cites examples of synthetic analysis in economics and condensed matter physics. Rather than choosing isolated elements of phenomena for analysis, synthetic analysis takes a synoptic view and builds a picture of the whole or wider problem. By breaking this problem into a number of smaller 'weakly interacting parts and modules, which are studied independently and thoroughly' (Auyang, 1999), synthetic analysis is able to construct an answer without losing sight of the wider problem.

> The process usually involves many approximations; and successive approximations improve and refine the solution. Synthetic analysis aims to answer questions about the composite system, therefore it never totally loses sight of the whole, even when it looks at the parts. In this it is opposite to reductionism, which is solely concerned with the parts. (Auyang, 1999)

Synthetic analysis brings naturalistic and scientific approaches together. For example, a nurse caring for a person and a biotechnologist working at a cellular level might appear to have very different concerns. However, synthetic analysis is an approach to understanding that brings these concerns together into one syndromic conversation.

> The best medical care will look at apparently unconnected symptoms together; the drug companies tend to promote medicines for individual symptoms but it is better I think to take a view of the syndrome as a whole and review it in the light of the patient's lifestyle. (Hopper, 2005)

Matchett's Fundamental Design Method, the so-called FDM, was an attempt to draw diagrammatically the principles of 'good design thinking' (Matchett, 1967). Matchett describes design as 'discovering and reconciling conflicts in a multi dimensional situation'. Matchett's diagram of his synthetic archetypes setting out four modes of thinking is described by Chris Jones (1998, pp. 180–1).

A Concept of the Design Process (Matchett), as drawn by Foreman, 1967 (see Jones, 1998).

(i)   'Parallel Planes' refers directly to a reflection of the position the designer holds in relation to his or her colleagues and clients.

(ii)   'Thinking from Several Viewpoints' is similar to 'Parallel Planes' except here attention is focused on the design problem rather than the process.

(iii)   'Thinking with Basic Elements' is a process-oriented approach and describes a process whereby thinking is divided into neat packages, so-called 'Techtams'. (This is almost 'M-a-t-c-h-e-t-t' reversed.) Techtams are the part of the process of analysis Jones (1998, p. 180) finds to be 'the most rational'. Techtams appear to be a rational process but are nonetheless breathtaking in scope and structure.

(iv)   'The Synthetic Archetypes' appear in a mode of 'Thinking with Concepts' and represent Matchett's attempt to understand how designers control the association of ideas. The so-called Roving Eye of the designer should be free to scan the 'potentially infinite space of knowledge' (Matchett, 1967).

Matchett claims FDM to be a liberating practice that enhances self respect. However, he admits there are emotional undertones and unpalatable aspects:

> ... Anyone wishing to try out FDM ... should recognise he is exploring the part of experience that is accessible through religion, through art, through psychoanalysis, through group dynamics, through drug taking, through insanity, through self-mastery courses and through indoctrination: it is an aspect of experience that some people believe to be wickedness or self-delusion and others believe to be ultimate reality and the ultimate good. (Jones, 1998 pp. 181).

Matchett's approach to design methodology is far more fluid and open than that of many of his fellows. While many attempts to construct a design methodology call upon a codified reduction of the process into a linear and logical stream, Matchett attempts a process of open synthesis. The methodology of synthetic analysis as it appears and as used in science is somewhat more formalised than Matchett's design process, yet it reveals the need to retain the poetical and the empirical in the consideration of the whole. Synthetic analysis suggests that, in the initial stages of problem solving, it is important to understand the shape of the problem rather than the specifics. Empirical data can be useful only when the larger shape of the problem is recognised. In the attempt to understand how industrial design can find continuity with its historical trajectory, there should be no need to necessarily bring quantitative analysis to the problematic explored. Prior to gaining a response from designers with regard to a problem they perhaps do not recognise, it will be important to come to terms with a broad range of complex and subtle problems and to weave them together into a single and comprehensible picture. Some theorists, such as De Landa (2000), take a 'morphogenenic' approach, understanding solutions to emerge from complex flows and the coming-together of ideas. De Landa argues that this process is somewhat self-generating and almost impossible to define. In design conversation, Gedenryd (1998) has set out the design process as a series of coterminous interactions rather than a logical progression. One risk that must be accepted in an approach that takes a synoptic view is that the subject of analysis

is likely to become huge, supercomplex and unwieldy. However, this risk must be accepted as necessary if space is to be allowed for a broader intellectual picture to develop that retains the more poetical and creative aspects of industrial design and to retain its discussion in terms that the community of its fellows can understand. The thesis then is like a directed design sketchbook in which ideas are explored and constructed.

PUTTING THE PRACTICE INTO EFFECT

The analytical method employed in the construction of the 'metathesis' bears some comparison to these design processes. Matchett eschewed fixed positions in his analysis and opened the space for more fluid and mutable forms of design analysis. In my thesis ideas from a broad basis were swarmed, such that, when read together, they formed an assembled body of knowledge that was not in itself exclusive, but created a pattern open to future reformation. The 'metathesis', in as much as it dealt with a discourse of abstractions, could then be understood as a conceptual and critical industrial design practice, written in the spirit of reflective and creative practice, although presented as a theoretical, textual design intervention. The words in the text came through a form of reflective and creative practice (Moon, 2004) in which ideas were gathered through a survey of a wide selection of literature and then surveyed, *de novo,* such that a wider more synoptic picture could be constructed. I avoided taking an entirely forensic analysis, and, being a member of that community, I could not view industrial design from a remote standpoint. That stance, however, made it possible to paint a richer and wider picture, which I believe enabled it to retain resonance in the terms of the industrial design community. Where a forensic analysis would have tended to focus on a single facet of an identified problem, by flocking ideas together in a way that revealed interactions, the problem as it is initially identified can be dispersed into a flocked condition that can then be analysed in order to give form to a wider problematic that may not be apparent in the more narrow appearance.. An analysis from a remote standpoint would have tended to view a problem without necessarily understanding the subtle nuances of the object of its observation, nor would it have necessarily understood the problem in a wider context. Because I was able to view industrial design from within its own terms, a more intimate and enacted theoretical picture of continuity could be constructed, nuanced in such a way that it retained meaning in its own community. Accordingly, the 'metathesis' assembled an experiential and implicit body of ideas (Schön and Schön, 1991) and undertook a synergistic analysis informed by a close reading of the practice of the industrial design community and much that is unfamiliar or disavowed within the scope of its discourse. This was an intellectual practice which used literature in order to formulate general concepts by abstracting common properties of instances and expanding ideas in relation to contemporary design practice.

Literature was surveyed because of its direct relevance to industrial design as it is practised, and other literature because it could be identified as relevant to the broad intellectual perspective of the 'metathesis', but always in terms that might be relevant to the design community. Much was necessarily edited out of the 'metathesis' if only for matters of expediency and the determining tyranny of the word count. The words then, might productively be read as the first section of a much larger project that in the case of my research, would include ideas that are more concerned with the subtle functioning of the soma. Ideas of the role of free will, non-conscious functioning, cognition and precognition and impulsive reaction that go some way to explain how people function in the world were simply, and reluctantly, left out, although they could have provided the scope for a further text. The words that remained acted together to put in place some of the philosophical and creative foundations for a future kind of industrial design logic that could have some resonance with its own heritage. In the process of research, much other literature was reviewed and rejected from the final 'metathesis' if it could not be grounded in terms that might be useful to further the understanding of the industrial design community (for example, if it relied upon sophisticated familiarity with the technical language of philosophy or mathematics). Ideas have been rejected if they were found to be insufficiently rigorous in their terms of debate. This particular rigour was necessary because in the process of research many ideas conflated objective physical phenomena with entirely subjective matters of faith and fantasy. Where these conflations were undertaken without criticism, the resulting ideas were discounted from the 'metathesis', even though some intellectual nuance may remain of them in the broader argument.

A strategy of interacting concrete examples with theoretical ideas was employed. This made it possible to play with ideas in a way that both revealed the subtle implications embedded in the quotidian and also tested theoretical ideas in the practice of everyday life. For example, the juxtaposition of a futuristic technology such as DNA computation was considered alongside an artefact as mundane as a bicycle in order to open out questions of enaction and the process of consciousness in the 'use' of technology and whether it was viable to consider technology as an extension of the human body.

The 'metathesis' enabled a view that there is a single holistic universe of interconnected possibilities. A 'metathesis' recognising the unbordered nature of the world could have easily become a theory of everything, and any exclusion was bound to be artificial and a matter of rhetorical strategy and convenience. Throughout the 'metathesis', complex ideas were unpacked and tried out through everyday examples of quotidian life. Care was taken to identify a range of ideas that explored how the human and the technological could be talked about in a single conversation. Though not without its critics, actor network theory has reflected a realisation that closure is no longer a viable objective and that the provisional is better accepted as a reality of analysis. The inclusion of actor network theory into the 'metathesis' made it possible to account for the materialisation of artefacts in terms of hybrid social and cultural energies in which people were considered to be determining actors in the performance of technologies. The interactional nature of the analysis that underpins actor network theory was such that its exponents are able to argue that humanity and technology must be considered as a hybrid condition. I proposed that the inclusion of ideas of actor network theory into the discourse of industrial design could bring a new approach to the analysis of the artefact that could find a mutable and fluid process. An understanding of the artefact as something mutable and fluid would throw a rather more subtle light upon the process of humanisation such that it would become necessary to find coherence in those revised terms. In this way the materiality of the practice was transformed into an entirely conceptual process, entirely in keeping with an otherwise supposed practice.

The methodological strategy for deciding which ideas should be included or discounted was similar to that described by Katrina Meyer (2004) in her analysis of online discussions. Meyer uses a number of categories described in earlier studies. These categories align with the views taken of texts encountered in this research. It is not important to list where any particular text might have fitted into any, some, or all of the following categories, because their role in the 'metathesis' may not have necessarily aligned with the decisions implicit in their initial inclusion. Throughout the process of research, ideas could be allowed a play such that they were able to change in status, moving between the periphery and the centre of analysis.

(i) Some ideas provided a solution to problems encountered in the research. Those ideas provided a way out of difficulties. Those ideas educated the researcher, showed him that his analysis might not be entirely new or revealed rather longer histories of ideas that might be studied in order to find a way through problems. Those kinds of ideas are perhaps what one might expect to encounter in a research. They were included and cited because they grounded and supported ideas.

(ii) Some ideas were included because they were constructed by fellows engaged in a process of creative exploration in a manner that bore comparison to the research. Those ideas discussed other problems in a similar way to the functioning of the analysis in my research. Sometimes those ideas were useful because they emerged from a research that encountered similar problems to the 'metathesis'. Those ideas were often familiar to the researcher and provided some of the impetus to the research. They were also what one might expect to find in any research and were almost always included and cited as examples in justification of ideas and approaches to analysis.

(iii) Other texts integrated and synthesised ideas. Those texts were perhaps the most complex to analyse. Their inclusion or exclusion was always the most problematic and the most likely to lead to the reader asking why another particular idea was not considered. That fluidity had to be accepted. In the end all ideas are constructed from a given intellectual and cultural location and are informed by the insight of their 'author'. It is inevitable that a text of limited scale and scope would miss the benefit of others' ideas. In the 'metathesis', these texts were included and cited in sections of more complex analysis as a means to help ideas along and to bring a form of intellectual rigour to speculative and creative practice.

(iv) Some ideas were included because they triggered new ways of thinking and lead to new ideas and new insights on the problematic. These ideas were most likely to be encountered in reference to other research, occurring by chance on the radio or television during moments of relaxation in an entirely unrelated context. Those ideas were found useful as a means of illustration through agility of synthesis. They were included and cited as exemplars of other ideas and are perhaps a more prominent feature of creative research.

(v) Finally, some ideas were included as a matter of play. Those ideas were proposed because they made other ideas seem unstable, because they brought delight or just because there was some resonance in them that invited readers to speculate on their own account. Those were most often included and cited in a way that sat alongside the body of the text and the drive of the argument, as interesting sights on a long journey.

It is important here to note that when dealing with complexity as a model of…… oh enough words…. below is what it looks like….. well something like it anyway.

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

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