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Using design practice to negotiate the awkward space between sustainability and fashion consumption

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Sustainability, fashion consumption and cognitive dissonance walk into a bar...

I love fashion! It is beautiful, frightening, exhilarating, confronting, elegant, communicative, intelligent, frivolous and thought provoking. However, we also know that fashion is the cause of massive environmental and social injustices. When the concept of 'sustainable fashion' was first touted, it was considered an oxymoron – and to many it still is. As how can an industry be considered sustainable when its primary concern is the propagation of the Next New Thing at the expense of perfectly functional existing products? Despite consumer desire for change – as shown in the worldwide awareness of sustainability and growing demand for sustainable products – the majority of the fashion industry are responding with what can be considered 'less bad' solutions – and as McDonough and Braungart (2002) write, 'being less bad is not being good'. 'Less bad' in the fashion world has predominantly meant using organic and recycled fibre within the current inherently wasteful clothing production and consumption model. At either extremes of the fashion system waste occurs with shocking familiarity. It is standard for garment producers to expect to waste approximately 15% of the cloth needed to produce an adult-sized garment (Feyerabend, 2004, p. 4; Abernathy et al., 1999, p. 136; Cooklin, 1997, p. 9), resulting in a loss of profits for the manufacturer, and landfill waste. It is also not unusual for a garment to have travelled vast distances to get from cotton field to consumer. The globalisation of the fashion industry has, in some cases, led to the raw material of textiles being grown in New Zealand, woven into fabric in Italy, designed in America and manufactured in China – generating vast quantities of carbon dioxide while divorcing the consumer from the production of the clothes they wear every day. At the consumer end of the fashion

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industry, the rapid and insatiable desire for new fashion products, which drives the fashion cycle and contributes 30 kg of textile waste per person in the UK every year, is growing so swiftly so as to be granted the term 'Fast Fashion', where new styles take mere weeks from design to consumer and 'affluenza' drives consumers to buy everything, now! – I wonder if we are in the midst of a rampant clothing 'epidemic'?

For me the conflict is triadic – I am sitting on the very pointy apex of a three-sided pyramid made up of sustainable designer, educator and fashion lover, and it is getting very difficult to keep my balance. The primary contributor to my unease is the knowledge of what I should be doing and its conflict with what I am doing and encouraging. Leon Festinger (1957) described this emotional state as cognitive dissonance and argued that when personal beliefs and actions do not align, one or the other will change so as to remove the source of discomfort, usually by justifying the actions rather than changing the behaviour. I have been doing a little of both and it is through this precarious balancing act I have discovered a new ease with unease – I realised that uncertainty can be a great innovator and that as long as you have a destination in mind, you don't really need to know how you are going to get there.

My growing confusion and dissonance began as a result of growing up in clean, green New Zealand, only to discover all is not so clean, green or pure as I believed it to be. A recent WWF Living Planet Report placed NZ as the sixth largest polluter per capita in the world (Hails et al., 2008) – a stark contrast to the '100% Pure New Zealand' trumpeted by my country's tourism industry. With such attitudes within my own country, it is not at all surprising that sustainable practices have been slow to be taken up here, as many New Zealanders fail to see the impact we are having on our planet due to most of our emissions being washed out to sea or blown off our coastline into the mighty Pacific Ocean never to be seen by us again. Compounding this is the fact that we import most consumer products into New Zealand, so the industries that create these are invisible to us. So it is from this background that I began my own journey to finding a way through my discomfort with fashion consumption and sustainability.

Precarious design: a design process that embraces uncertainty as a way of responding sensitively to both materials and the instability of the environment. It is a step away from egocentric, hierarchical design

models, which prevail, and a step towards communal open-source garment design and production.

Certainty and risk

Humans have been attempting to control the natural world for millennia. We like to be able to predict outcomes, to minimise risk and uncertainty, and we love to design processes and products in which we exert control over our environment and the organisms in it, giving minimal respect to the reciprocal relationship that living on the same planet must involve. As a result, the majority of these processes and products work one way – we take good from the environment and give back our junk. In the fashion industry we take nutrients, sunlight, water, soil and plants to grow cotton, and in return we give back a design, production and consumption cycle that contributes to global warming, social injustice and environmental degradation. As the certainty we had in our ability to continue to do this indefinitely begins to waver, we must consider what can be done. The natural reaction as a designer is to attempt to regain some certainty in a new product, process or way of life – to believe that design can save the world. John Wood wrote of 'our egotistical attitude to innovation' (in Chapman & Gant, 2007, p. 104) as being more or less responsible for the environmental and economic mess we are currently in. It is frightening that the vast majority of so-called innovative and creative design results in products for which innovation is limited to aesthetics and a general desire for new things, which ignores issues of the environment and depleting resources. Our arrogance in our ability to control the world we live in has led us to this, so consider for a moment that perhaps neither control or certainty, nor the risk of complete unknowns are the answers – instead we as designers need an openness to adaptation and to adopt a more holistic approach to design. For me this means I must balance precariously between what I know and what I want – I needed to plan a destination but have no set course to get there.

In this uncertain world it makes sense to use design processes that mimic the adaptive natural world. Generally, clothing collections are designed with a specific end product in mind, but can clothing be designed in a different way, which better reflects the unpredictable world we live in and achieve this in a sustainable way? The general process from design to production follows: design; pattern making;

construction; and production. The separation and hierarchy of these processes has led to a cut and sew fashion system which is extraordinarily wasteful – the act of garment cutting ends in an average of only 85% of effective textile use, leaving the other 15% on the cutting-room floor (Feyerabend, 2004, p. 4; Abernathy et al., 1999, p. 136; Cooklin, 1997, p. 9). From these figures, Timo Rissanen (in Hethorn & Ulasewicz, 2008, p. 187) estimates that at least 100,000 tonnes of fabric is wasted to make clothes in the UK every year. This waste has traditionally been seen as a production problem – designers draw the garments, pattern makers make the patterns and when the pieces are laid out for cutting there is a marker made to minimise waste – it is this hierarchical system that leads to so much of the fabric being wasted. However this waste can be minimised if design and production were to become more integrated – and closer to the processes of nature. Wood (in Chapman & Gant, 2007, p. 111) writes that the use of resources in a holistic production-to-consumption system would need to become a zero-waste system – as in nature. Indeed, if the fashion process were fully integrated it becomes possible to reduce the wastage figure to zero, but only through a readjustment of acceptable levels of calculated risk and uncertainty within the design/production process, presenting a major hurdle for many designers.

In teaching our first-year design students, we encourage them to embrace uncertainty – to be OK with the unknown – yet few feel comfortable doing this. Within fashion design there are too few examples to show students to inspire them to take these risks. Many fashion designers merely regurgitate past styles and follow the same well-worn path from idea to production to retail and eventually to waste. One designer who deviates from this is Julian Roberts. His process does not follow the usual rules or order of design to pattern making; his is a process where the design is the pattern making, is the cutting, and it results in garments which defy many of the norms of garment design shape and form. His creations only reveal their form once on the human body – lending their freshness to an unpredictable and integrated design/pattern making process, which is developed from a range of rules he established himself (Roberts & Cheung, 2008). He has called one of his processes 'subtraction cutting' as the final shapes are determined by what is removed and what is inserted into the space created. He has taken this method and applied it to a fashion system

that designs for individuals, making personal that which is usually a slick sort of anonymity; this form of consumption encourages true ownership and attachment to clothing beyond the throwaway fashion cycle that is so dominant today.

Timo Rissanen is another designer engaging with new ways of fashion production. He identifies that it is the segregation of the pattern making and design process which inhibits further evolution of the fashion system. He has developed a process of zero-waste garment design whereby his method of 'jigsaw-puzzle garment' (in Hethorn & Ulasewicz, 2008, p. 184) design results in all pieces of the garment pattern being utilised in the end resulting garment. To do this, he needs to design both two dimensionally to achieve a jigsaw piece effect on the cloth with zero waste, and consider three dimensionally the design of the garment at the same time. This method of fashion design relies on a certain degree of ease with unpredictability, as there is – at least initially – a lot of guesswork. He writes, 'if designers were open to some degree of trust in such unpredictability' (in Hethorn & Ulasewicz, 2008, p. 202), then his puzzle-piece method of making clothing would be more readily adopted.

Luis Eduardo Boza (2006) writes of the possibilities when combining two seemingly opposing strategies – computer numerical controlled (CNC) machinery with handcrafted processes – for interior design. His students were encouraged to exploit unexpected events in the production process – to use the 'mistakes' the machinery or their programming of it made and 'as a result, the design/fabrication/assembly process expanded and exploited the findings from the intended and unintended discoveries. Ultimately, this process was informed through a physical contact with the material itself'(Boza, 2006, p. 7). This process of risk and uncertainty and subsequent sensitive reaction to this can lead to unexpected positive outcomes that respond sensitively to material, form and environment. So it seems there is a creative advantage in uncertainty.

Another way to design

Employing risky design methods is only one way of subverting the wasteful fashion system, and to truly fight the sustainability cause we need a more holistic approach. We need to design whole new systems of

design/production/consumption which products are designed for use within. Through doing this, the whole lifecycle of a product is considered and established from the first moment of conception – we need to embrace cradle-to-cradle design (McDonough & Braungart, 2002).

Proponents of sustainability often encourage the use of less – do more with less – and that to do so is an indicator of good design. And this is where my own personal dissonance enters, as I often question why I design anything at all if all it is doing is contributing more stuff to the environment that we don't need. Within the fashion world the idea of less is, for most, a little frightening. With capitalism itself being based on the ideals of growth – more, faster, cheaper, I don't wonder at the struggle many of us have with having and using less. And despite personally rarely buying new clothes because of the overwhelming guilt I associate with it, I am part of the industry that generates new makers of more stuff. I am fully aware that if everyone consumed clothing the way I do, most of the students I help train would not get a job, I would possibly not have a job, and the industry which creates some things I truly love would not be in existence. Braungart and McDonough (2002) argue that if we change our systems and products then we don't need to make do with less in order to sustain our lives on this planet. The notion that we may not have to do with less to be sustainable certainly appeals to me – that by redesigning things as biological nutrients, so that they give back to the carbon cycle at the end of their useful life, or can be endlessly reused as technical nutrients in a closed loop of production and consumption. Can fashion be both a technical and biological nutrient?

Considering a textile as a biological nutrient is a relatively easy step to make and is one that many designers have or are beginning to adopt. By using natural materials such as cotton, wool and silk that aren't treated with chemical compounds such as inorganic dyes then garments can be returned to the earth they came from and we could all use them to grow our organic veggies in when their fashionable life is over. Technical nutrients are a little more difficult, as what makes textiles a good biological nutrient is what makes it a generally unsuccessful technical nutrient – they tend to biodegrade too fast and can only be 'down-cycled' (McDonough & Braungart, 2002). However, fibres such as polyester can be reused/recycled an almost infinite number of times before they lose quality, so some fibres would make great technical nutrients so long as they did not contribute toxic substances in their production and use. I am interested in utilising textiles as a technical nutrient while there is still material integrity and as a biological nutrient once their fashionable life has ended. Therefore the fibre would have to be natural and dyed using natural and non-toxic processes, and, crucially, there would need to be a redesign of the system of fashion production and consumption that encourages a closer relationship between producer and consumer, product and owner.

Figure 1: 3D transformation

Attempting to design fashion clothing for a technical and biological nutrient cycle led me back to my master's project, First Son (McQuillan, 2005), which explored the potential of dresses made from a single piece of cloth that could be returned back to that single piece of cloth. They transformed from 2D to 3D and back again (Figures 1 and 2). I designed five variations (Figure 3) of this idea from the same size and shape piece of cloth. While the rationale for using this process was not sustainable design, it showed the possibilities of designing garments with no waste. It also revealed the possibilities of multiple variable designs within one cut of cloth – as each garment could be worn a number of ways depending on how the fastenings were configured. Thereby reducing the number of garments required in a wardrobe to satisfy personal desire for variety.

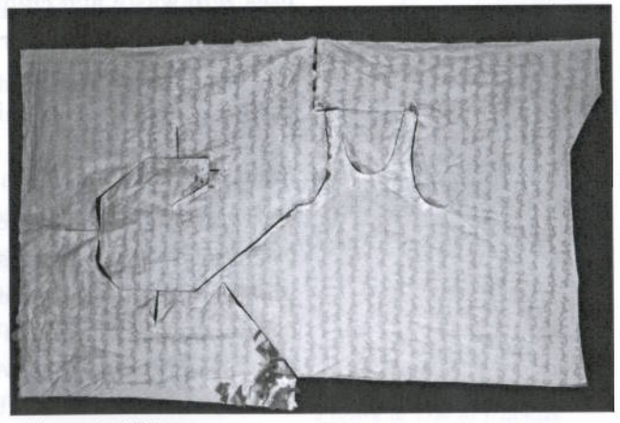

Figure 2: 2D layout

Figure 3: Five variations

While the objective of First Son was not fashionable clothing, it was my first foray into a risky or precarious design process. The design evolution of each piece wove like a narrative, starting with one set size and piece of cloth, which I cautiously cut into to see how each cut and tuck would influence the next, and craft the design of the dress. I was guided by the process of storytelling and memory. Sometimes I cut too far and had to start again; it taught me what actions are reversible on cloth and which are not, and it taught me how mistakes can be good.

Precarious design begins by treating the raw materials of garment production with integrity. It reveals what becomes invisible in the consumption of fashion garments – the textile, the hand of the designer, the waste generated and the discarded unfashionable clothes we throw out every new season. It is an absence of absence – nothing is missing. It is a project intent on creating wearable and desirable garments through an integrated design/production/consumption process, which uses zero waste and cradle-to-cradle philosophies. Beginning with the production of half-scale prototypes (to reduce fabric use in the prototype phase), I have explored the potential of two zero waste garment design/construction techniques.

Precarious: Kindest Cut

This process is designed with the objective of using one pattern composed in a tessellating pattern, cut once through multiple layers of different cloths that produces an almost infinite number of possible garment designs that can be returned to the designer and remade into new designs when the owner becomes bored or when fashion changes. This system transforms the garment pieces into a form of technical nutrient. So long as a fastening system can be resolved, the pieces can

be reconfigured a number of times into different garment designs before the material is degraded. This system enables the production of both tailored and fluid designs, depending on the configuration of the pieces and on the fabric used.

Figure 4 was my first attempt at utilising tessellations to generate garment pieces with a delicate balance of form and versatility, whilst attempting to utilise the whole piece of fabric. The repeat could be scaled up and down to generate a range of aesthetic directions for garments and the design of the garment could be entirely different depending on how each piece was arranged and the material used. The shapes that make up the tessellation were designed to respond sensitively to the shape of the body – to curve under arms, wrap around the neck etc. – while still being able to fit into a tessellation. However, as you can see, there would be edges that are not incorporated into the tessellated design and would need to either be waste or potentially awkwardly incorporated into the garment design. I wanted a solution that was by design more integral.

Figure 4: First tessellations

A solution I found was in mathematics and, in particular, fractals. A commonly known example of the use of mathematics in art are the works of M. C. Esher, in particular his work with what he called the Circle Limit and what is commonly known as his Reducing Lizards tessellation. The use of fractals borrows from natural patterns and forms, but its use to me is of a more practical nature. By decreasing the size of the tessellated pieces at the sides (Figure 5) there is less fabric waste, while simultaneously giving more variety and options for final garment design. Using nature as a model for design seemed to me to be a logical step in a sustainable direction and represents a sort of economy of evolution that has intrinsic beauty and is naturally environmentally sympathetic.

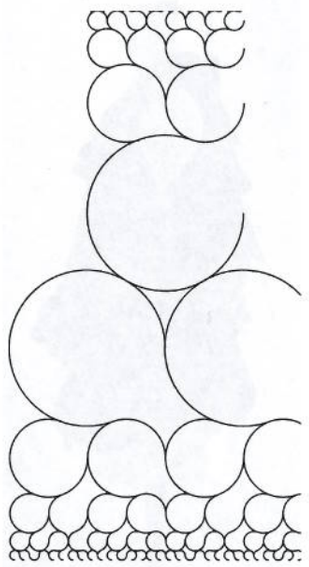

Figure 5: Use of fractals

This design process is both risky and certain, as I can't predict what the garment design will be before I cut the cloth, but the designer has control over how to use each piece to make the final design. Using these as a basis for garment design is a radical shift from existing pattern-making models of design for clothing but one which uses available technology and materials and can be disseminated freely anywhere – all that is required is a designer, or home sewer, to pin and sew their design together. I don't see a way to scale this process up to mass-

7a: Garment front

7b: Garment side

production within the current system, so it would force a localisation of the garment industry. It also encourages an intimacy between designer, producer and consumer, which reunites all three after decades of separation.

Precarious: No Leftovers

No Leftovers develops ideas from the pattern-cutting techniques of Julian Roberts from his online Julian and Sophie School of Pattern Cutting (2008) and combines these with the objective of zero waste design to generate a range of knitwear that provides unexpected fluid and organic forms. Based on Roberts' 'plug' technique, whereby any shape can be inserted into any void so long as the diameter of both are the same, enables any part of the garment that is removed for fit or design to be reincorporated into the design of the garment – creating unexpected outcomes that encourage the wearer and designer to take risks. Figures 6 and 7 show a pattern and garment design possible using this process. Both the No Leftovers and Kindest Cut methods are designed to democratise garment design and production, and encourage trial and error and risk-taking in the design process. They are both zero-waste garment design methods and add to the growing list of processes and designs developed from this method, showing that the only restriction to what is possible is your imagination.

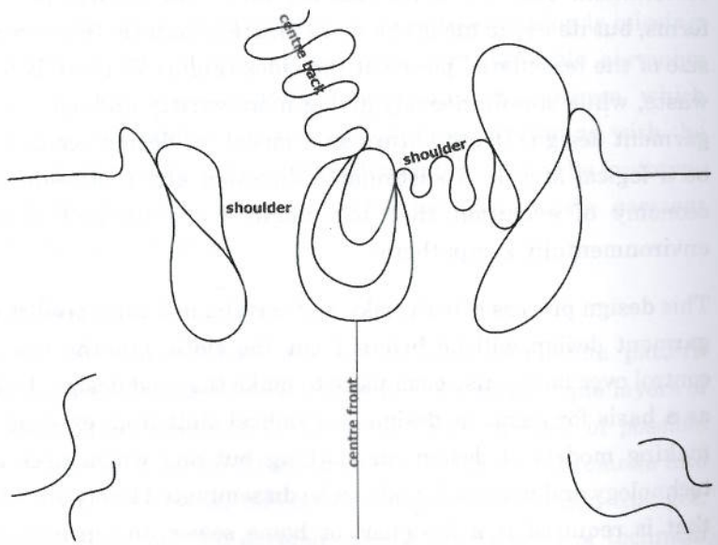

Figure 6: No Leftover garment pattern

Conclusion

In an attempt to avoid discomfort I have tried to discover a comfortable spot in the maelstrom that is sustainability. For most, that comfortable spot is the use of organic materials, but merely using organic materials in the existing fashion system model is less bad – and less bad is not good enough. Relying on traditional material techniques and processes alone is not enough to transform the fashion industry to the degree that is needed. This is not to say we should stop buying clothes – but when the fashion industry is responsible for the proliferation of 30 kg of waste per person per year in the UK alone, the way we manufacture clothing needs to change at a fundamental level; we need to remake the way we make clothes. So how is this possible? The future of the fashion industry does not lie in exporting whole garments but in the development of innovative clothing design/production/consumption systems that can be disseminated freely and adapted for anywhere in the fashion world. In my research I have focused on exploring new ways of clothing creation that could serve as a transition process between old and new, where the resolution of my personal conflict is to embrace this conflict, as it is a creative advantage, resulting in confronting new ways of designing, producing and owning clothes.

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