



Refashioning textile waste

Session 20

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Space Between: A model of social innovation for fashion

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Sustainable Fashion

In 2012 the company New Zealand Post and Kiwibank approached the Massey researchers with the declaration “We have a problem. We have a waste stream we would like to take responsibility for.” The company currently source around 9,000-10,000 garments per year from a corporate uniform manufacturer which once they have reached their end of life; i.e. either worn-out, or obsolete after a redesign or a change in corporate branding; due to security issues, and to protect their corporate image, they are exported to Papua New Guinea to be disposed. This issue prompted Whitty and McQuillan to ask, can they as fashion researchers/designers develop a collaborative solution for step-change through social innovation with a corporate partner by extending their environmental responsibility? Can they adopt and implement new green business thinking (Niinimäki) to address these issues and develop alternative connections between design, manufacturing systems and consumption habits? Their response has been to establish a strategic enterprise/research innovation at the College of Creative Arts in Massey University called ‘Space Between’ (2015) that has led to a new business model for fashion design. It takes the form of design-led activism, exploring the potential of a ‘fashion incubator’ for fashion enterprise and research with an agenda to bring about ‘positive change’ in industry. It proposes a new social dimension for design practice, social development and for increased societal participation in the design process (co- design/pre-order/feedback fashion/crowd sourced). It will be oriented towards addressing sustainability issues such as resource depletion, consumption and production. The innovation incorporates Alastair Fuad-Luke’s framework for contextualising design activism (2009). The design actions and outputs will result in: information/communication (online, workshops, garment patterns etc), process (manufacturing/design techniques), action (design and production) and artefacts (garments). It will aim to find a sustainable balance (Niinimäki 2013) between the design, manufacturing and consumption of garments by reducing the speed, volume and impacts of ‘waste-ready’ global consumerism by examining the product-service system to transforming negative consumption and production patterns. It will enable designers (students/graduates/lecturers) to harness the ‘waste’ from industry to work together towards a shared goal. Space Between (2015) has the potential to make a meaningful contribution to the economic and social development of New Zealand and other communities globally because it utilises a ‘solution oriented design’ method of addressing waste stream from industry. It creates employment as a social enterprise in partnership with EarthLink; and provides an opportunity for students to integrate real world experiences into their learning.

Keywords: New business models, design-led activism, sustainable fashion, social enterprise, university ‘third’ space.

Introduction

Ezio Manzini asserted at the Changing the Change conference that 'despite the good intentions of many, design still continues to far more "part of the problem" than "part of the solution" (2008, 4). In his opinion it functions to hasten unsustainable practices rather than advocating 'new ways of being and doing to help individuals and communities live better, reduce their ecological footprint and regenerate the social fabric'. (Manzini, 2008, 4). Kirsi Niinimäki (2013) asserts that it is in fact the current design, manufacturing systems and economic models that have led to unsustainable fashion consumption and its resultant waste stream. This system is as Jonathan Chapman says 'fundamentally flawed' (2005, 5) but reveals the values and preoccupations of our society. These social issues of consumption and waste run deep and are complex but are often neglected as the discussion around sustainability in fashion and textiles, which often focuses on technical concerns. (Fletcher 2008). In William McDonough and Michael Braungart's opinion 'human beings don't have a pollution problem; they have a design problem' (2013, 7). They propose that if designers worked together with society to create more intelligent ideas from the outset we would not have these issues of waste. The Centre for Social Innovation at Stanford (2015) assert that 'ultimately, the most difficult and important problems cannot be understood, let alone solved, without involving the non-profit, public, and private sectors'. The vehicle of social innovation is key for the designer in order to create social change. According to The Design Activism strategy developed by The Textile Toolbox (2015) the designer becomes a 'social innovator' when they work with society at large. Working away from a purely 'symptom focused approach' (Chapman 2005, 9) gives more depth to the sustainable design agenda for fashion design researchers and students. Working to create fresh solutions for industry offering as Bert Mulder (2011) describes a more strategic use of design in a social context rather than just the simple functional design of a garment, which can, as Otto Von Busch (2012) says confront the status quo and suggests new possibilities.

This paper explores a new green business model (Niinimäki, 2013) for fashion design, which acts as a platform for social innovation and enterprise. Situated in a tertiary institution working in conjunction with the not for profit and private sectors it takes the form of design-led activism as described by Alastair Fuad-Luke (2009) and Von Busch (2012). It adopts new systems thinking (Niinimäki 2013) it has an agenda to address issues of waste and bring about 'positive change' in industry. Space Between asks the tertiary sector, private and not-for profit work together to develop a new kind of sustainable fashion system that can create value for people, planet and profit.

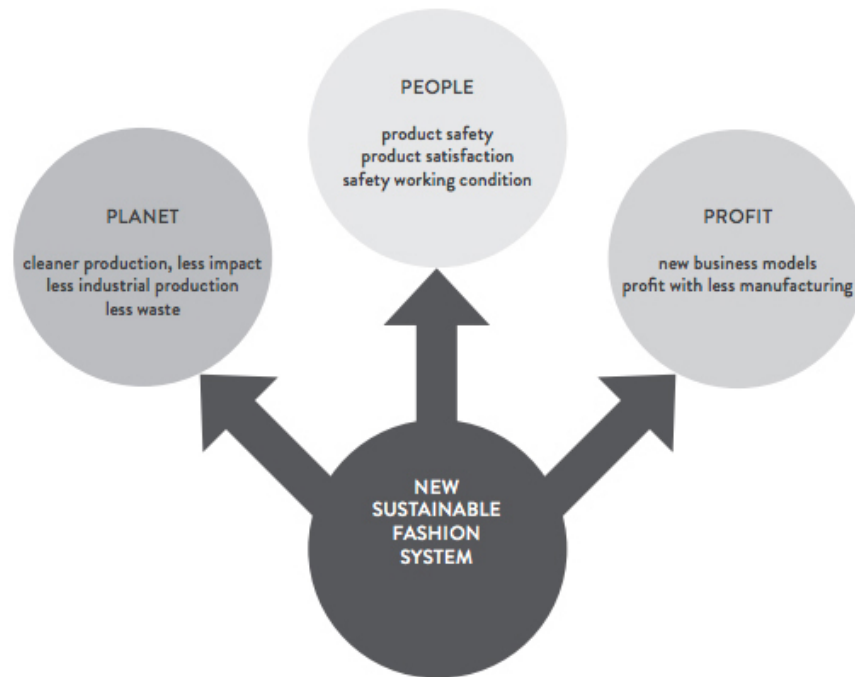


Figure 1: Green Business Thinking. A sustainable fashion system that can create value for people, planet and business (Niinimäki, 2013)

Waste from Industry

The current waste stream from the fashion industry is the result of an energy intensive complex linear supply chain that was shaped over 150 years ago during the Industrial Revolution. This system created a one-way track for goods, which the World Economic Forum refers to as the 'take, make and waste' model (2015).



Figure 2: The linear system of fashion

It is estimated by WRAP (2015) that 16 million items of branded corporate clothing are disposed of every year in the United Kingdom, which equates to approximately 39.2 million individual garments. The majority of this clothing is made from polyester due to its durability, low cost and ease of maintenance. Currently only 9% of this is recovered for reuse with an additional 1000 tonnes captured for shredding. The disposal of these items can be attributed to a number of reasons ranging from end of use products, to new logos or colours, updated uniforms or failure to sell. The process for addressing this waste is shredding for fleeces and polo shirts, which result in a low-grade material, which can be used for filling, or alternatively they are incinerated or sent to landfill.

Once in landfill the biodegradable fraction of the garments breaks down releasing greenhouse gas such as methane emissions to the air and pollution to groundwater through toxic chemicals (Fletcher 2008). According to Uniform Reuse 'The UK clothing industry is responsible for the release of 3.1 million tonnes CO₂ equivalent per year, or about 0.4% of total UK emissions.' (2015). Wasting these garments means wasting all the embodied energy and materials that they contain such as fibres, dyes, chemicals as

well as water, human time and labour, fossil fuels and electricity. Hollingsworth (2007) claims that about 45% of garments can have a second or third life cycle prior to their disposal. Reusing rather than landfilling clothing provides a range of sustainability benefits. For example, every tonne of discarded textiles reused saves 20 tonnes of CO₂ from entering the atmosphere. The energy used to collect, sort and resell garments are between 10-20 times less than that that is needed to make a new item (Fletcher 2008).

According to Uniform Reuse recovery of corporate wear in the UK is currently operating on a relatively small scale (less than 5%), they propose that there is untapped environmental and market potential in this area. (2015)

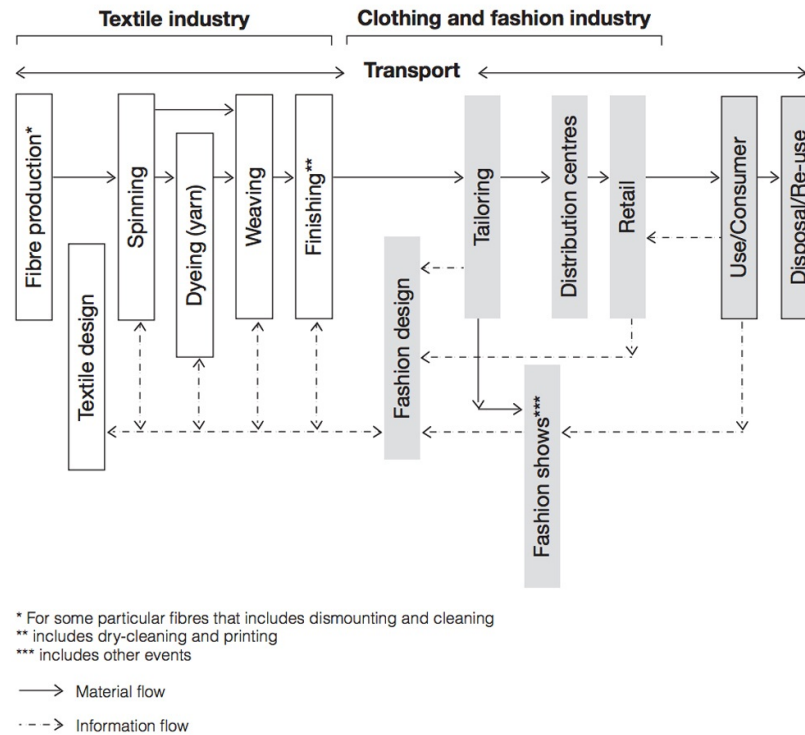


Figure 3: Environmental and social impacts of the textile, clothing and fashion industry.

System Innovation: Cross sector collaborative projects.

Marttila and Kohtala (2014) assert that university research is still the principal focus for knowledge creation and dissemination in the world. Nieminen (2004, 22) discusses how universities are defining a new emerging 'third role' that highlights knowledge creation for society based on current problems and projects. The Centre for Sustainable Fashion (2015) at the University of the Arts London have been using fashion to drive change and build a sustainable future by providing a foundation and an environment to facilitate collaborations between education and business. They have extended their commitment to working with industry by embarking on a five-year collaboration with Kering and initiated the research project FIREup' (2015) to drive sustainable growth and collaboration as it enables links to be made between fashion enterprises and university research. The collaborative project EDUfashion (2009-2011) brought together The University of Ljubljana, The University of Milan and the Copenhagen Business School with the aim of fostering 'community, collaboration and innovation to provide a new vision and practice for fashion'. (2011,7). Li Edelkoort asserts that we can change the mechanism of the fashion system by bringing together a diverse range of stakeholders to create a collaborative framework, which supports both individual and collective innovation.

Activist strategies for System/Social Innovation

The field of activism is broad but essentially all activists are involved in 'taking actions to catalyse, encourage or bring about change, in order to elicit social, cultural and /or political transformations' (Fuad-Luke 2009,6) The online project Openwear developed by EDUfashion is an example of such an approach as it critiques the dominant logic of the existing fashion system. It proposes an alternative platform based on values of sharing and dissemination combined with politically mobilized local production. Openwear enables designers to share patterns and production methods while also hosting workshops and production labs similar to 'hacklabs' which empower people towards peer-led 'learning-through-doing' and ultimately a less passive role for consumers. Web platforms such as Wowcracy (2015), Not Just a Label (2015) and Etsy (2015) could also be viewed from this perspective. They have altered the power dynamic of the industry by enabling and empowering global communities of creative entrepreneurs to instigate and grow businesses on their own terms. These interventions create as Von Busch (2012) describes 'alternative ecologies of practice' producing alternatives to the dominant product- service system and new expanded visions for fashion design. This prompted the researcher Whitty to ask, how can we as designers/researchers/lecturers develop activist collaborative solution for step-change through social innovation and activism with industry partners to develop an alternative fashion system?

Methodology

Space Between (2015) is a new green business model for fashion, which addresses people, planet and profit. It can be viewed according to The Centre for Social Innovation at Stanford's (2015) three key mechanisms that are driving contemporary social innovation:

- Exchanges of ideas and values
- Shifts in roles and relationships
- The integration of private capital with public and philanthropic support.

The innovation incorporates Alastair Fuad-Luke's framework for contextualising design activism (2009) in order to rethink some of key aspects of the industry, to foster innovation and provide a new vision and practice for fashion.

The design actions and outputs will adopt the strategies of the 'Considerate Design' (2007-9) project as developed by Sandy Black, part of the 'Designing for the 21st Century' research initiative (2005-2009).

Post/modern Pilot

The concept began in 2008 with a visit to The Estonian Academy of Arts by Whitty to observe the results of their in-house fashion brand HULA (2015) led by a cohort of students and staff who create local small-scale designs as part of their curriculum. The pilot project Post/Modern, conducted from May- July 2012 (2014) was initiated when Booker Spalding, a corporate uniform manufacturer, and NZ Post, one of it's corporate clients, approached the researchers Jennifer Whitty and Holly McQuillan to carry out a pilot study to identify a more sustainable method of "disposing" of their end-of-life retail uniforms. Whitty and McQuillan, examined their current system and subsequently developed a series of up-cycling (remanufacture) processes, design strategies and

techniques which could be applied to any given garment, including other corporate uniform manufacturers. The pilot helped determine the viability of and next steps required to make the project applicable on a larger scale.



Figure 4: The Post/Modern Pilot 2012

Space Between

Space Between (2015) is a new social enterprise that offers a thoughtful new way to design, make and use locally-produced fashion which aims to design out textile waste and design in 'closed loop' solutions. It is a bridging mechanism for students' pre and post graduation to address issues of waste in industry while developing their entrepreneurial capability. It operates in the 3rd space where students / staff / industry (NZ Post, Booker Spalding and EarthLink) work collaboratively together to provide solutions. It provides a "safe" space for testing and developing ideas with a direct link to the market as they explore new platforms for fashion; bridging the physical and digital realms of creating, producing, thinking and distributing clothes. The innovation demonstrates solutions for the industry's waste stream (post -consumer corporate uniforms) in the form of a capsule limited edition collection designed by Massey fashion researchers made by EarthLink a not for profit who opens the door to employment for many people with health and social barriers (2015). It will also develop new research promoting a shift in fashion towards zero waste through products and services by exploring different models for the future of fashion challenging the predominant roles and relationships between and among designer, producer and consumer (DPC).

EarthLink Incorporated developed Earthlink Apparel a subset to their core operation and has established a workshop with key operational equipment and personnel through funding from the Hutt City Council. The researcher Whitty was successful in obtaining the Vice Chancellor's Strategic Innovation Fund- Entrepreneurial Partnership Platform from Massey University in 2014. This has been supplemented by in-kind support in the

form of the post-consumer uniform from NZ Post which has enabled the project to be formalised providing infrastructure, overheads, and external costs such as website design and development.

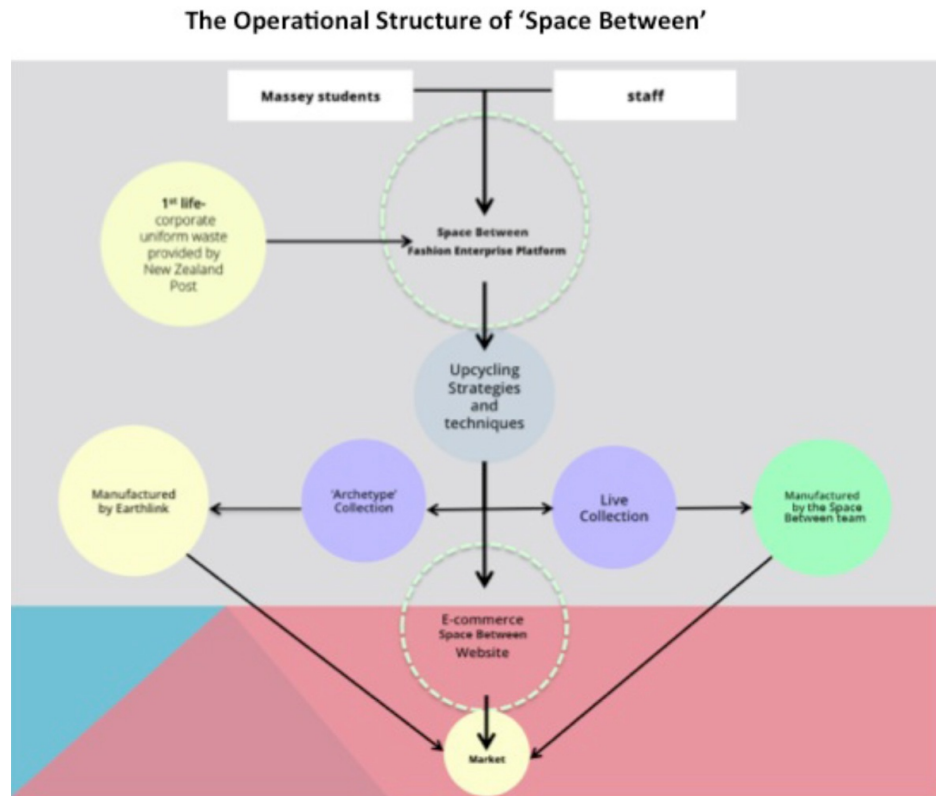


Figure 5: The Operation Model for Space Between

Harnessing the Waste from Industry

Rethinking waste is vital to the initiative as it is committed to applying circular economy principles (Ellen MacArthur Foundation, 2015) to design to develop projects and remanufacturing techniques, which aim to be zero/minimal waste. Similar to the approach adopted by Alabama Chanin (2015), Space Between will be zero waste or minimal waste across the operation, as all materials will be repurposed for future collections or other outputs. NZ Post have already provided 20,000-30,000 redundant garments for use in the overall project and have committed to supplying Space Between with as many garments as needed for the platform. The possibility of growth is quite real, as there already been in discussions with several other large New Zealand organisations about upcycling their redundant uniforms and garments. This would extend the current thinking and create greater scale for the initiative. It would also reduce waste, allow for new designs, new markets, and provide a constant supply of materials. However, sharing the philosophy of Worn Again (2015), Space Between aims to ultimately 'to *design out* textile waste and eliminate waste from industry by *design in closed loop*' solutions.

A New Local System

Human and social capital (Fuad Luke 2009, 7) are central concerns to Space Between. The team has worked in collaboration with their manufacturers Earthlink (Niinimäki, 2013) to engender trust, generate reciprocity and to develop good practices across the supply chain. Both Earthlink and Space Between share sustainable goals and the mutually beneficial objective to create a local industry, which alters the conventional designer- manufacturer relationship. The forms of the Fundamentals range for Space

Between are aligned with Earthlink's operation as they work within the parameters of Earthlink's capability. New designers often difficulty gaining experience as labour conditions are marked by long hours (60-70 hours) and a work environment that is hierarchical (Romano 2014). Space Between sets out to challenge these work patterns by creating 'new ecologies of work' (Von Busch, 2012) which are horizontal creating communities rather than vertical and top down which enable graduates to create jobs for themselves on their own terms. They will as Busch (2012) asserts allow employees to 'build their own network of roads, a shared space for other types of fashion to emerge'. Space Between will encourage collaboration, working towards a positive model for fashion that is connected and not dislocated from society as advocated by Li Edelkoort (2015) in her recent manifesto.

Conclusion

Space Between makes a strong assertion for the potential of working collaboratively in a multidimensional capacity. The initiative can advocate new practices for an expanded view of fashion. Within the current environment it is clear that we cannot enact change by following our business as usual practices and working in isolation. Our networked society is ripe for developing partnerships that can link many partners and stakeholders across different sectors. Through this project Space Between aim to encourage a shift in industry practices whilst setting up new opportunities for designers, producers and new participants. By engaging in a form of design-led fashion activism they assert that we can explore an 'integration of action into new grids, connecting practices, making new sense of the world'. Space Between proposes a new form of green entrepreneurialism, which advocates business as a way of achieving and sustaining social, environmental and financial, goals, not the opposite.

References

- Alabama Chanin. 2015. Accessed 7 February. <http://alabamachanin.com/>
- Busch, Otto von. 2012. Textile Toolbox, *Design Activism*, Accessed February 10, 2015.<http://www.textiletoolbox.com/research-writing/design-activism/>
- Centre for Sustainable fashion. 2015. Accessed 10 February. <http://sustainable-fashion.com/>
- Chapman, Jonathan. 2005. *Emotionally- durable Design: Objects, Experiences and Empathy*. London. UK: Earthscan.
- Considerate Design. 2009. Accessed 10 February. <http://www.consideratedesign.com/>
- Edelkoort, Li. 2015. "End of fashion as we know it." *Dezeen*. Accessed 15 March. <http://www.dezeen.com/2015/03/01/li-edelkoort-end-of-fashion-as-we-know-it-design-indaba-2015/>
- Earthlink Incorporated. 2015. Accessed 8 of February. <http://www.earthlink.org.nz/>
- Ellen MacArthur Foundation. 2015. Accessed 10 January. <http://www.ellenmacarthurfoundation.org/circular-economy>
- Etsy. 2015. Accessed 8 January. <https://www.etsy.com/>
- FireUp. 2015. Accessed 12 of February. <http://www.fireup.org.uk/>

- Fletcher, Kate. 2008. *Sustainable Fashion & Textiles. Design Journeys*. London, Earthscan.
- Fuad- Luke, Alastair. 2009. *Design Activism, beautiful strangeness for a sustainable world*. London and Sterling, VA: Earthscan.
- Hollingsworth, J. 2007. "Waste Couture Environmental Impact of the Clothing Industry", *Focus*, Vol. 115, No 9, p. 2, September, <http://sehn.igc.org>.
- Hula. 2015. Accessed 10 January 2015. <http://www.hula.ee/esileht/01/>
- Marttila Tatu and Kohtala Cindy, 2014. Transdisciplinary Platforms: Teaching Sustainability to Design Students. In *Product-Service System Design for Sustainability*, edited by Vezzoli, Carlo; Kohtala, Cindy; Srinivasan, Amrit; Diehl, J.C.; Fusakul, Sompit Moi; Xin, Liu; Sateesh, Deepta, Greenleaf Publishing, Sheffield, UK.
- Manzi, Ezio, 2008. 'New Design Knowledge. Introduction to the conference Changing the Change.' In *Changing the Change Design, Visions, Proposals and Tools Proceedings*, edited by Caral Cipolla and Pier Paula Peruccio, Allemandi Conference Press, World Design Capital Torino. <http://www.scribd.com/doc/71560496/Changing-the-Change#scribd>
- McDonough, William and Braungart, Michael, 2013. *The Upcycle: Beyond Sustainability--Designing for Abundance*, North Point Press, New York.
- Mulder, Bert. 2012. 'Design and Government', *Opendesign Now*, Accessed February 8, 2015. <http://opendesignnow.org/index.php/article/design-and-government-bert-mulder/>
- Not Just a Label. 2015. Accessed 8 January. <https://www.notjustalabel.com/>
- Nieminen, E., Linke, M., Tobler, M. and B. Vander Beke 2007. 'EU COST Action 628: life assessment (LCA) of textile products, eco-efficiency and definition of best available technology (BAT) of textile processing', *Journal of Cleaner Production* 15: 1259-1270.
- Niinimäki, Kirsi. 2013. *Sustainable Fashion: New Approaches*, edited by Kirsi Aalto University publication series. Accessed 10 June. <https://www.taik.fi/kirjakauppa/images/57175badb573d97c59ec6a99ecc1011c.pdf>.
- Niinimäki, K, 2012. *Proactive Fashion Design and Green Business Thinking*, The Nordic Textile Journal, pp61-69. <http://innovating.sustainablefashion.files.wordpress.com/2012/07/proactive-fashion-design-and-new-green-business.pdf>
- Openwear Band Manual. 2011. Accessed 12 of January. http://issuu.com/openwear/docs/openwear_brandmanual
- Post/Modern Collection. Strategies for Post Consumer Waste. 2014. Accessed 12 of April 2015. <http://jenwhitty.wix.com/postmodern-2>
- Romano, Zoe. 2014. Fashion, Luxury and Sustainability at Supsi. Accessed 6 February. <https://zoescop.files.wordpress.com/2013/02/passionatework.pdf> <http://www.slideshare.net/zoeromano/fashion-luxury-and-sustainability-at-supsi-2014>
- Space Between. 2015. Accessed 20 April. www.spacebetween.ac.nz
- Sustainable Clothing Roadmap Progress report. 2011, Accessed 10 January 2015. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69299/pb13461-clothing-actionplan-110518.pdf
- The Centre for Social Innovation at The Graduate School of Stanford Business. 2015. Accessed 2 February 2015. csi.gsb.stanford.edu/social-innovation

Textile Toolbox. 2015. Accessed February 10. <http://www.textiletoolbox.com/>

Uniform Reuse. 2015. Accessed 10 January 2015. <http://www.uniformreuse.co.uk/>

Worn Again. 2015. 'Info/About'. Accessed 10 January 2015. <http://wornagain.info/about/>

World Economic Forum. 2015. Accessed 10 January. <http://www.weforum.org/projects>

Wowcracy. 2015. Accessed 8 January. <http://www.wowcracy.com/Wrap>. 2015.

Accessed 10 January 2015. <http://www.wrap.org.uk/content/partnerships-are-key-success>

Earthlink: Upcycling Corporate to Children's apparel Engaging Strategies for Designed Reuse

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This study examines the beginnings of interactive design involvement with aims of facilitating transformative thinking in design production and consumerism in upcycled children's apparel design. The research builds on an existing project with a company where recycled corporate uniforms are currently redesigned into children's apparel. The case study involves a social firm 'Earthlink' utilising a unique position in the local community, supporting mental-health consumer and non-consumer staff. Other large-scale corporate companies support this initiative by making available large volumes of obsolete corporate wardrobe for the upcycling project. These companies are committed with a sustainable mission to reduce, re-use or recycle materials, disposal and landfill costs. Massey University has been contributing to the project with design research and patternmaking supplementing design production with alternative processes.

This paper discusses the context of this project and initiatives to support one of Earthlink's key strategies 'to encourage consumer preference for a brand that supports environmental sustainability and the disability sector'. The study was planned in two parts. The first part facilitated a pilot focus group in order to investigate levels of understanding and perceptions of upcycled apparel, and broad apparel and purchasing preferences of prospective customers. It is intended that this pilot study inform a larger online forum. The second part comprised of a design and production workshop that involved a community group, design facilitators and the firm's management and production staff. This workshop exposed the participants to new processes of design and making garments with a sustainable motivation. The firm is able to gain valuable insight of design preferences and needs of their customers, learn further sustainable design practice methods and build relationships within the organization and outside community.

A collective creativity is experienced with a devolvement of design processes to the participants in the focus group and design production workshop. This model of co-design involves changing the way an organization interacts to set up a mode of engagement and understanding of sustainable design practice. This is a strategy focused on participatory customer and community group experience and a social firm's interactive relationships.

Keywords: *Upcycled apparel design, Participatory design*

Introduction

This paper discusses the beginnings of an interactive design involvement with the aims of facilitating transformative thinking in apparel sustainable design production and consumerism. Recently there has been a significant move by designers, apparel companies, government and non-government organisations to make positive changes directly related to issues of environmental and social impact. An increased awareness of sustainable issues has begun to be seen across the apparel sector, including cyclical design thinking, ethical and efficient manufacturing and sourcing of materials, and management of waste (Gwilt 2015, WRAP 2012). The reassignment of clothing designated to landfill through reuse has significant benefits to the environment and reduction in resources needed to produce new garments (WRAP 2012). This case study of 'Earthlink Apparel' exemplifies a unique organisation that is creating upcycled children's garment designs from obsolete corporate uniforms. This research is part of an ongoing project with this firm to support one of its key strategies 'to encourage consumer preference for a brand that supports environmental sustainability and the disability sector'. The projects aimed to increase awareness of the 'Earthlink Story' and the product design the company offers, as well as to seed a change of thinking in apparel design consumption with a stronger appreciation of sustainable design and manufacturing processes.

The first part of this research facilitated a pilot focus group to investigate levels of understanding and perceptions of upcycled design and broad design and purchasing preferences for childrenswear with prospective customers. It is intended that this pilot study inform a larger number of regional groups and an online forum through a social media site. The second part comprised of a pilot design and production workshop that involved design facilitators, a community group and the firm's management and production staff. This co-creative and experiential workshop shared and generated new ideas in design and making garments with a sustainable motivation.

Case Study: The Earthlink story so far

The Earthlink organisation operates from their location in Wingate New Zealand, with a focus on resource recovery across a range of diversified products from across the Hutt Valley region. Through their recovery reuse and recycling function, Earthlink provides supported paid employment, training and vocational services for clients Tangata Whaiora who have health and social barriers including mental health and addiction. It has built its reputation regionally and nationally as a comprehensive non-profit organisation, providing supported employment, work-focused education/training within a business model that supports and operates sustainable business and environmental practices.

Earthlink Incorporated entered into a relationship co-facilitated by the Hutt City Council and Booker Spalding Limited, original manufacturers of corporate apparel, to recycle un-used and good-condition used, obsolete corporate clothing. These garments are obsolete due to corporate reimaging, however most are in good condition suitable for either minor alterations and amendments, or upcycling into newly designed garments. New Zealand Post supported the pilot initiative by making available recent outmoded wardrobe. Since July 2013 to February 2015 Earthlink has received approximately 30 tonnes of corporate apparel. At this stage, Earthlink has committed to an estimated volume of 100,000 garments in the first year with plans to extend to additional corporates seeking similar solutions. For corporations like Booker Spalding and New

Zealand Post, benefits can be measured against environmental sustainability policy, while savings are recognised through reduced disposal costs.



Figure 1: Earthlink children's design 2014

Earthlink Apparel is developing a range of upcycled childrenswear, with their operation running as a revenue-producing 'Social Firm' utilising their experience in the local community. It comprises an integrated workplace recruiting 25% to 50% of employees with a disability or workplace disadvantage. Earthlink Apparel provides a unique opportunity to provide benefit to the umbrella organisation and its consumer and non-consumer staff, as well as providing significant social, reputational, financial, and personal developmental opportunities to the key stakeholders supporting the programme. They have gained support from Ministry for the Environment's 'Waste Minimisation Fund' which will enable the development of a sustainable business unit over a three-year time frame. The firm established its workshop through funding provided by both the Hutt City Council for 'Silver Lining' projects, and from its own resources.

From the initial supply of garments, Earthlink developed a small range of upcycled children's items. Working with existing garments as raw material to generate upcycled designs has different challenges in design and production possibilities and a Massey University design team is supporting the project with this current research. There are several key activities that Earthlink Apparel has currently prioritised including development of new design and production processes and methods and research of the market including perceptions and potential, and promotional activities.

Earthlink Apparel will find itself in direct competition with large, low-cost clothing retailers and importers. They have a potential pricing advantage for garments that require little intervention because they have quality garments supplied in the first instance at no cost. However the margin on these garments needs to be sufficient to cover re-manufacturing and handling costs with sorting and storage being high. Earthlink manages all aspects of the processing of their current garments into a range of finished outcomes ensuring use of 100% of product. These divide into four potential categories; upcycle into new apparel 65%, minor alterations to garments for resale 20%, rags and smaller items for resale 10%, and shredded stuffing and packaging 5%.

Earthlink's goal is to grow at a manageable pace, increasing their product range and quantities to match the market opportunities and demand yet to be quantified. The major advantage in Earthlink's favour is its rare position in the local community. Their business divisions support the social firm concept, have flexibility, and are not singularly focused into one specific area, enhancing the opportunity to develop strong

relationships with local identities such as councils, and private and commercial business partnerships. While their business operations and services meet the same market demands as private and commercial operations, they ensure that Earthlink clients' tangata whaiora are pivotal to all activities.

These factors make the firm unique and attractive as both a provider of products and services to many community segments and individuals, and also as a potential partner for successful companies wishing to support an environmentally, economically, and socially sustainable organisation.

Pilot Focus Group

Aim and methods

A pilot focus group was planned to gain a better understanding of perceptions of upcycled children's wear and shopping and design preferences of potential customers of Earthlink apparel. This project saw the potential to engage a larger and wider variety of social groups involved in interactive focus groups and social media blogs to invigorate on-going discussions of purchasing and design preferences of the apparel range. A pilot focus group of ten regular purchasers of clothing for children aged 0-9 was facilitated through a snowballing technique of invited participants. In order to gain a wider understanding of potential consumers, participants were invited from a regional area other than the immediate location of Earthlink where informal marketing had previously taken place. Semi- structured broad open-ended questions were used to guide conversations. This was recorded and transcribed verbatim. Phrases, sentences and paragraphs were rigorously reviewed and codes were developed to group responses according to the aims of the project.

General findings- preferences and perceptions

Initial discussions focused on the group's preferences and experiences of purchasing children's apparel. Most bought new from retail stores as well as markets or online. There was stronger preference expressed for buying from retail or markets as they wanted the tactile experience and a number had experienced problems with sizing through online purchases. However they saw the potential of purchasing basics items as merino leggings, T-shirts, and singlets. Nine out of ten participants liked the idea of recycled clothes although the majority were given these by family and friends. Comments were made on the benefits of finding unique designs of better quality and there was an annoyance with cheap lower quality mass manufactured apparel labels. This coincided with findings in earlier research investigating consumers perceptions of second-hand clothing (Balasubramanian et al. 2014). There were further open questions related to re-use and there was a strong interest in the idea of upcycled designs for childrenswear. One participant experimented with upcycling but had a fashion background and considered this as a fun creative exercise to engage with her own children. Nine out of ten participants perceived a distinctive difference between recycled and upcycled designs and expressed the benefit of added design value in the latter.

General findings from Sample Design discussions

The raw garments were shown to the group to rate the fabrics for potential use prior viewing the garment design samples. The fabric types are limited due to corporate supply

of garments, many being striped cotton polyester shirts and knit garments in merino wool and synthetic mixes. All participants voiced strong preference for pure merino wool knit for the younger age grouping (years 0-3) , for reasons of quality, feel and wearability and expressed strong dislike for synthetic knits. Some of the knit fabrics were seen as too 'adult' and dark in colour with preference for softer colours. They did see the potential for upcycled designs in the fine striped cotton polyester woven shirt fabrics.

The samples of the upcycled designs were shown and the participants were asked to rate the designs and discuss these evaluations in terms of design preferences. There was valuable feedback gained for the company on the popularity and potential of specific sample lines along with a number of design contributions for further product development. Discussions indicated that fashion trends were important as well as conventions in shape and silhouette appropriate for the age of the children.

The participants were also asked to give an indicator price point for the individual garments. It became apparent that they were prepared to pay more for what was considered quality finishing, for example contrast facings, bodice linings, contrast bindings. On being asked for general feedback on pricing, most of the participants suggested they would pay slightly less or equivalent to new garments.

The focus group approach generated significant interest in the aims and motivations of the firm and also an intrigue in the different mode of product development required in upcycled garment designs. The premise of 'good' design remained paramount and there was an open willingness and enthusiasm to support the project after being involved in the group discussions. Comments were made on the "clever design use of garments in the samples". The one participant who was openly reticent of any benefits of second-hand clothing for children expressed a change of position to her earlier responses. Feedback from all the participants proposed that distinctive designs, which emphasised the 'story' of Earthlink, with associated branding prints, swing tags, and labelling, would have a successful take-up.

Interactive Design Workshop

Aim and Methods

A pilot design and production workshop was set up with design facilitators, a group of school age students and the firm's management and production staff. This was a co-creative participatory workshop to generate ideas for design and making upcycled children's garments and planned as a pilot for schools and other local community groups. A part of New Zealand's secondary school technology curriculum has a strong sustainable focus for projects in the accredited qualification. The workshops align with this learning requirement and also promote the aims of Massey University and Earthlink to extend understanding of sustainable and ethical design practise in the local community.

Workshop facilitators from Massey University had prepared new samples of upcycled designs with strategies using the raw garments' existing shapes and design detailing as a base for newly developed pattern dimensions. These involved shape reversal; sectional cutting of garment shapes incorporating existing sewn pieces and reconstructing detail into different parts of the garment body. These methods posed new ways of viewing design development and methods for the production team and the student group. The designs showed purposeful elimination of further construction, for example the use of existing hems and edges already cover stitched for finishing, and

the use of buttons, plackets, zips in raw garments to be utilised as openings with alternative placement and function.



Figure 2: Exemplars of new sample designs 2015

The workshop began with open discussions about existing fashion design processes for mass manufacture and consequent environmental concerns. Design and creative thinking was posed as a tool for positive solutions to these issues. All levels of the staff, including management and the production team, discussed Earthlink's aims, motivations and challenges. Samples of upcycled designs were used to show various ways of pattern and construction. Two methods were exemplified; conventional method with the use of pattern manipulated from a flat block to follow a drawn design and cutting out from the flat raw garment and an alternative method utilising the original 3D aspects of the whole garment shaping and construction details as a design trigger. The challenges of upcycling from existing garments were outlined with these samples and process demonstrations including limited fabric choices, sizing restrictions within the garment shapes, cutting around labels and damaged worn areas, use or elimination of existing design details.

All participants worked together in the development offering collective expertise and experience to make a new design prototype.

Workshop Outcomes

A new design was generated from the workshop in an environment of enthused participation in sharing of ideas, questions, garment selections, problem solving, shape-making, pattern marking, measuring, cutting, sewing, teaching, learning, experimenting,

more cutting, questions, trim selecting, sewing some more and a joint pat on the backs on completion.

The process of devolving the design to the group generated an engagement in the whole process. It did require a different mindset for most to derive the designs from the shapes of the existing raw garment without defaulting to the cutting of predetermined design and pattern shapes. However there was almost a sense of magic when the raw garment was sliced, flipped and re-inserted with seaming and hem trim added with no additional construction for fastening or topstitching. Certain aspects of construction needed expertise in solving an appropriate sequence in response to the changed shape and quality finishing but the time taken for this brought new knowledge. A broader understanding of the time needed and skills involved in the making of the dress instigated some interesting discussions of design value. With the particular design utilising only the back of the raw garment, the group then wanted to further the exercise to another design adapted to fit the remaining front. This was seen as an efficient variant of the first prototype, triggering more discussions on design transformation and multi-use in design detailing as well as size adjustments and mass manufacturing application of these cutting methods.



Figure 3: Pilot Workshop participants 2015

Reflection

This case study of design enquiry through a focus group and co-creative workshop illustrates the beginnings of participatory design to further support the goals of an already established environmentally, economically, and socially sustainable organisation. The Focus group gave valuable information to the firm on what customers would like to purchase in children's apparel design and responses confirmed the customers' desires to participate in the design process. Both the focus group and workshop facilitated an opportunity to tell the 'Earthlink story' as an exemplar of how a sustainable business can address environmental and social issues. There was a positive reaction and affirmation that consumers are starting to look for distinctive design quality or value added design linking to ethical and societal benefits. There appeared to be a wider consciousness and genuine interest to support a business with sustainable aims. Research has indicated that eco-consciousness in the actual purchasing behaviour has not extended to apparel to the same extent as other products (Niinimäki 2010). However this research indicated there may be a distinctive shift beginning to occur which aligns with a growing number of apparel design practitioners looking for alternative processes and systems (Armstrong and LeHew 2011, Cramer 2011, Fletcher 2014, Gwilt 2015, McQuillan and Whitty 2014).

The creative workshop generated new ideas in terms of product and potential systems, which can be applied to new mass manufacturing methods for upcycling obsolete garments. The interactive workshop exposed the group to standardised methods of apparel design and manufacture in a commercial environment and new alternative processes of design and making. The production and management team with active participation in the design workshop shared design and production insights, gained new design ideas, and learned further sustainable design practice methods in design pattern cutting and construction. By understanding what goes into the making, fashion became connected with sustainability in a broad sense, fostering solution-based design strategies. These experiential groups were able to participate in new learning, which induced a more meaningful understanding of the processes and issues. On an individual basis the participants discussed the future possibilities of upcycling their own garments, questioning their own fashion consumption and practise.

These group and co- creative experiences went beyond product development and facilitated a greater understanding of social connection, building relationships within the company, outside facilitators and local community groups. Outcomes saw the potential to integrate material and social lives while still operating in a market driven environment. In this sense there can be beginnings of a change of thinking in design values with interconnectedness to social groups and the environment (Fletcher 2014, 142-144). The success of the workshop has seeded ideas to extend the participatory workshops to more schools, other local community groups and also other invited designer facilitators. The devolvement of design to co- creative groups can potentially lead to new and evolving design solutions and systems of manufacture, which can transgress the local to the global environment.

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References

- Armstrong, Cosette M. and Melody L.A. LeHew. 2011. "Sustainable Apparel Product Development: In Search of a New Dominant Social Paradigm for the Field Using Sustainable Approaches." *Fashion Practice* 3: 29-62.
- Balasubramanian, Ravi and Deb Cumming, Janet Webster, Raja Peter. 2014. "Consumer Perspectives of the Second-hand Apparel Market in New Zealand: An Exploratory Study." Paper presented at the annual Australia New Zealand Marketing Academy Conference, Brisbane, Australia, December 1-3.
- Cramer, Jo. 2011. "Made to Keep: Product Longevity Through Participatory Design in Fashion." *Design Principles & Practices: An International Journal*, 5:438-445.
- Fletcher, Kate. 2014. *Sustainable Fashion and Textiles*. London and New York: Routledge.
- Gwilt, Alison, trans. 2015. *Fashion Design for Living*. New York: Routledge.
- Niinimäki, Kirsi. 2010. "Eco-clothing, Consumer identity and Ideology." *Sustainable Development* 18:150–162.

Whitty, Jennifer and Holly McQuillan. 2014. "*Post/Modern Transformational Strategies for Post-consumer Corporate Waste*." Exhibition in Shapeshifting Conference, Ironbank Building, Auckland, New Zealand, April, 14-17.

WRAP. 2012. "*Valuing our Clothes: The True Cost of How We Design, Use and Dispose of Clothing in the UK*." Banbury, UK: WRAP. Accessed February 5.

www.wrap.org.uk/sites/files/wrap/VoC%20FINAL%20online%202012%2007%2011.pdf

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Sustainable fashion design: Minimization as a future design strategy for people, profit and planet

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Fashion & Textiles Design

In Australia and New Zealand the practice of outsourcing fashion and textile production has led to the parallel outsourcing of some of the resulting negative environmental consequences. However, the loss of manufacturing jobs and an increasing amount of consumer sales being directed to offshore brands also contributes to emerging social and economic problems. This practice-led research aims to encourage a broader perspective of waste minimization as a strategy to address the known problems of post-consumer textile waste that result from a consumer focused, global fashion system. The author proposes a theory of minimization, throughout the production cycle, as a potential design strategy to generate a stronger commitment between the fashion industry and more sustainable design practices. A culture of excess and wastefulness, that devalues fashion garments without conscious consideration of the raw material, production or design value, is impacting the potential for more sustainable consumer practices. In addition to textile waste, excess exists in manufacturing processes where the cost of labor is devalued and the need to develop designed, streamlined, efficient and ethical manufacturing methods is not as significant to reducing production costs. An exploration of design practice that engages with a reductive method of design development, through alternate strategies for garment cutting, patternmaking, grading and construction, provides the basis for an analysis and discussion of how design can contribute to reducing waste within the designer fashion industry. Design is proposed as a driver for a localized fashion scene focused on developing micro-fashion business models. The implications of this project are that a focus on waste as a physical by-product of contemporary manufacturing systems, producing product for an international fashion marketplace, is leading to missed opportunities for developing localized, sustainable design solutions.

Keywords: *fashion, textiles, design, sustainability, waste minimisation, practice*

Introduction

The problem of textiles waste is not new to the fashion and textiles industry. The focus of sustainable research throughout the past two decades has identified and explored a wide range of problems arising from unsustainable industry practices that continue to have negative environmental outcomes. The associated social and economic aspects of unsustainable practices are now returning to the foreground of discussions around sustainability. Recent tragedies involving the horrific death of hundreds of factory workers, such as the 2013 Bangladesh factory fires, profile the human face of the problem of unsustainable practices within the global industry. While the environmental issues are real, addressing the social aspects of continuing mass consumerism and mass production is becoming equally imperative. Over-production and over-consumption have become characteristic of this type of manufacturing model and result in a prematurely shortened product life-cycle. In other words, fashion contributes to a culture of planned obsolescence and under-use that has led to unsustainable levels of wasted labour, raw materials and — although less obvious — wasted design. An advantage of focusing of the design phase of a product life-cycle is that design deals with the problem of textiles waste *before* it occurs rather than aiming to provide solutions to a problem that already exists.

In response, this paper discusses the changing meaning of waste within contemporary fashion research and aims to highlight that fashion waste extends to labour, resources (other than textiles) and knowledge (the generation gap). The aim is to identify that practice-led research has a lot to offer in addressing unsustainable practices within fashion and textiles by engaging with the design of fashion objects in an innovative and practical way. The author argues that the impact of this type of design research has been affected by the belief that reflective practice is limited to the single case. A re-examination of a design research project (Finn 2008b, c) reveals that the greater contribution of the research exists within the objects and artefacts that resulted from the method of creative practice, rather than those explicitly identified within the accompanying exegetical statement. A case is made that Schön's (1983) model of reflection-in-and-on-practice, whether by the original practitioner or by other practitioner researchers, can offer deeper insight to existing research and has potential as a method of disseminating practice-led research outcomes.

Strategies for developing more sustainable fashion practices

The vast amount of textiles waste within the fashion industry has resulted in committed research within the emerging field and has been an area of focus for a fashion researchers from a large number of different countries. A review of existing literature and practice surrounding fashion textiles waste reveals that there are three dominant approaches to addressing the problem. Firstly, strategies such as zero-waste cutting aim to prevent the waste of textiles in the production phase of the garment lifecycle (McQuillan, Rissanen, and Roberts 2013, Rissanen 2013). Secondly, aiming to extend the original garment life-cycle through the provision of reliable garment services draw on a 'mend and make do' approach (Gwilt 2012, Finn and Fraser 2014). Finally, interventions that aim to divert textiles from landfill at the end of the garment life-cycle include strategies such as up-cycle, re-make and re-use (Fletcher 2008, Fraser 2009).¹ Amongst the dominant strategies the focus has been to prevent or reduce the amount

¹ This is a summary of different approaches with some examples. These are not intended to represent all the research being undertaken in these areas.

of textiles that ends up in landfill by extending the 'use' phase of the garment life-cycle through the development of various methods of redesign and reuse. However, all these approaches are dealing with the *second life*² phase of the garment object. The Full Circle Collection (Finn 2008b), developed through practice-led design research, is different because it identifies the opportunity for a problem created by design to be solved through design (Finn 2008c). In other words, through adopting minimization as a design strategy to engage with generating more sustainable practices within the fashion and textiles industries.

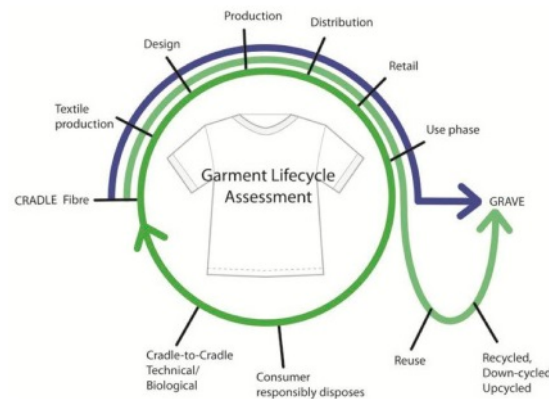


Figure 4: "Garment Lifecycle Assessment" by Alice Payne, www.thinklifecycle.com (reproduced by permission)

Waste Minimization

Existing waste minimisation strategies focus on exploring the original cradle-to-grave garment life-cycle and more recent research proposes a move to a closed-loop cycle. For example, Alice Payne (2013) has developed an award winning diagrammatic that illustrates the potential of an extended garment lifecycle (Figure. 1). Research in progress is beginning to explore a potentially endless life-cycle through textiles reuse becoming known as a 'cradle-to-cradle' approach. While the idea of an endless textiles life-cycle is undoubtedly an advantage to the environmental aspects of unsustainable practices, the solutions are becoming more macro and aimed at large scale industrial processes.³ This is good to solve immediate problems of textiles waste if we limit the definition of waste to raw material and that define sustainable practices as those that cause 'zero' environmental impact. The advantages of working with action research methods and exploring research led by practice is that engaging with the more bodily aspects of research also engages the mind in the social and economic aspects of sustainable research. In layperson's terms, humankind needs to earn money and undertake useful and meaningful labour as well as try to protect the environment for future generations. In tandem to research focused on improved environmental outcomes as a key aspect of sustainable production, there is also practice-led research that explores design as a method of engaging with the social and economic aspects of sustainable fashion design. While waste minimisation tends to be defined through effective *reuse* of textiles, the original use phase (*first life*) is being largely overlooked as a site of potential minimisation through effective design. A key finding explored through the Full Circle Collection (Finn 2008b) is that minimisation should extend to

² This is a term coined by the author to categorize this approach to sustainable redesign/reuse and identify the opportunity to engage with a first life initiative such as those demonstrated through the Full Circle Collection (Finn 2008b) and (Finn 2008c).

³ For example, Patagonia™ style 'pop bottle polyester' – textiles that have potential to be endlessly recycled.

include minimising labour as well as minimising costs (therefore maximising profits) but also as a way of engaging with alternate profit models and considering Prosperity as a form of profit in the sustainable design formula based on the Three Ps (People, Profit and Planet).

Practice Led Fashion Research

Fashion research is still an emergent area in terms of developing a fashion discipline that includes perspectives from design practitioners (Finn 2014). In general, while individual researchers and funding bodies have invested heavily in practice-led research in the field, the outcomes of this research are still developing and the methods of communicating research outcomes are still taking shape. Reflecting on past practice is a means of demonstrating the relevance of research that, at the time, may have been presented within an arts practice framework but has ongoing relevance to contemporary discussion of fashion contexts such as sustainable fashion design. The remaining section of this paper re-examines existing practice-led research outcomes (fashion garment prototypes and ephemera resulting from design practice) to draw out findings that were encapsulated within the practice component of a dissertation. This research project (Finn, 2008) consisted of a practice-led component that formed 80% of the dissertation, completed through a body of work consisting of designed prototypes, supported by an exegesis that formed balance.

In designing a collection aimed to directly engage with developing more sustainable practices, and within the limitations of postgraduate studies that are inherent in all universities, there are processes and concepts that are obvious to practitioners but are not necessarily made explicit within the current models of communicating practice-led research within the university environment. Equally, these findings may be less effectively communicated if the outcomes of creative practice are not documented effectively to enable the transfer of knowledge through object. This has been explored through the author's research elsewhere (Finn 2008a, 2010, Finn 2014). In terms of developing more sustainable methods that engage with sustainable design, the practice-led outcomes of 'Full Circle: A collection of prototypes' (Finn 2008b) resulted in the development of a theory of 'design for redesign' (Finn and Fraser, 2013) that proposes extending both the *first life* of fashion garments by building in the option for redesigning by minimizing invasive cutting and construction in the first instance.⁴

Minimisation as a Sustainable Design Strategy:

Reflecting as an expert practitioner (Melrose 2005) on the design process, and the opportunities for developing more sustainable fashion through design, there are five key areas where designers have an opportunity to improve design outcomes in terms of sustainability (Table 1). A motivation for the original study was not to minimize textiles waste but to address problems that had begun to emerge for local industry as a result of 20 years of off-shore manufacturing in New Zealand. While the New Zealand designer fashion industry had begun to develop (albeit in a micro-business environment) the capability for designers to have work locally manufactured was limited (Hamon 2007). The designer fashion that was available in New Zealand was driven by mainstream fashion brands and centred on traditional Western fashion silhouettes (Molloy 2004), was technically difficult to produce and required both highly skilled

⁴ Finn and Fraser have collaborated on many research projects. Fraser's approach to textiles reuse identified that her design had been informed by the original cut of the trousers used to generate ReFashion (2009) collection.

labourers and specialist machinery. There was a generation gap of skills identified between a once highly skilled local labour market and current workers who had been trained to work on a production line (piece workers) rather than whole garment machinists. Set up costs for individuals to operate a small scale manufacturing business were high largely due to capital investment that was required to purchase industrial machinery and equipment.

Table 1: Analysis of Key Concepts for Waste Minimisation in Fashion Manufacturing

Reduce environmental damage resulting from a larger than necessary carbon footprint from global transportation by manufacturing locally.

Reduce the requirement for continuous lengths of textiles to facilitate cost saving mass manufacturing methods for cutting by designing garments that required minimal cutting and could potentially be cut with scissors on a standard table.

Avoid standard Western design aesthetics such as 'jacket' and 'shirt' that are constructed using methods of invasive pattern cutting and pattern grading that in turn cause textiles waste and additional labour costs.

Design garments for local manufacturing within the confines of the generation gap in terms of cutting and construction skills for design fashion garments.

Design garments that have flexible sizing to avoid costly methods of computerised pattern grading and marker making geared toward cost cutting for mass manufacturing.

Source: Based on observations made as a result of professional design practice between 1986 – 2006

The aim for the design practice was to directly engage with these issues through design. The analysis of the literature and contextual review revealed that opportunity for sustainable manufacturing required a different approach to design. Examining the key issues, a design philosophy was developed that aimed to focus on minimisation as a means of rebuilding a local industry by directly responding to the negative aspects of offshore production identified in Table 1. The resulting prototypes demonstrate that it is possible to develop a designer fashion collection that is capable of being manufactured utilising more sustainable production methods. The aspects of designing with the goal of avoiding waste, rather than designing using existing waste, has the potential to extend the original life of the garment by minimising invasive procedures to the cloth in the *first life* leaving room for more potential in the object's redesign should it not be used to its full capacity before it is discarded. The minimisation of pattern-cutting, pattern-grading, labour costs, machinery required and level of skill required proved an effective design strategy in producing an unexpected design aesthetic that has the potential to become a distinct handwriting. The designs, shown in Figure 2, are argued as demonstrating an element of longevity in terms of design aesthetic over a period of six years. This is considerable within a contemporary fashion context.



Figure 5: Garments from the Full Circle Collection (Finn, 2008b)

Summary of Design Outcomes

The Full Circle Collection (Finn 2008b), developed as part of practice-led sustainable design research, demonstrates that design practice can offer a unique strategy to engage with sustainable design by designing within self-imposed limitations. The resulting body of work creates a localised design aesthetic that is the result of a local system of design and manufacture. In this case, garment cutting was minimized through design – garments can be cut efficiently with scissors and can utilise remnant fabric pieces unsuitable for larger scale manufacturing systems. The majority of garments within the collection are constructed using straight sewing with a basic industrial machine and therefore minimises the capital investment required to purchase expensive specialist machinery. Each individual garment has been designed to require minimal training for workers to learn how to make. Garments have also been designed to have flexible sizing or can be ‘graded’ through a formula while cutting (rather than requiring a separate cardboard pattern for each size). This is a different approach to thinking about waste within the garment life-cycle as well as within the textiles life-cycle. The resulting design aesthetic rests on the development of a core wardrobe called ‘skins’ that are produced to a high quality with expensive materials. In contrast to the less constructed pieces, these are investment pieces that aim for longevity, to last across many fashion seasons, and be worn until the textiles are no longer viable. The final collection demonstrates the foundations of a theory of fashion practice that can be enacted within commercial and social environments to build more sustainable fashion systems, with low start-up costs and potential to build self-employment business models through design. In summary, this research resulted in the development of a sustainable design philosophy that attends to the wastefulness within the environmental, social and economic aspects of unsustainable fashion production.

Conclusions and Further Research

The opportunity, and challenge, for practice led researchers in fashion is to develop methods of recording and communicating fashion research outcomes so that they might be useful to other practitioners in a manner that is equivalent to publication for traditional journal articles and books. This paper, reflecting on past practice-led research, provides an example of how practitioners might advance research in the field of sustainable design by sharing research outcomes through fashion objects. In this way, researchers can draw on both traditional methods, such as publication, and develop new ways of transferring this object knowledge through diagrammatic and image.

References

- Finn, Angela, and Kim Fraser. 2014. "Fake Remake: The role of the luxury fashion market in driving sustainable fashion practices." In *Sustainable Luxury: Managing Social and Environmental Performance in Iconic Brands*, edited by Miguel Angel Gardetti and Ana Laura Torres, 28-42. Sheffield, UK: Greenleaf Publishing.
- Finn, Angela. 2008a. "Fashion design research: Research methodologies for emerging researchers." Paper presented at Alpha Alpha Alpha November Zulu: Annual Conference of Art Association of Australia and New Zealand, Brisbane, Australia, December 4-6.
- Finn, Angela. 2008b. "Fashion manufacturing in New Zealand: Can design contribute to a sustainable fashion Industry?" Honours Exegesis, Auckland University of Technology.
- Finn, Angela. 2008c. "Full Circle: A collection of prototypes." Designed Collection, Silk, Wool, Acetate lining. Private Collection [Brisbane, Australia].
- Finn, Angela. 2010. "Ways of Telling: Research Methodology for Fashion Textiles Design." Paper presented at ICERI 2010, Madrid, Spain, November 15-17.
- Finn, Angela. 2014. "Designing fashion: an exploration of practitioner research within the university environment." PhD Thesis (Monograph), Queensland University of Technology.
- Fletcher, Kate. 2008. *Sustainable Fashion and Textiles: Design Journeys*. London: Earthscan.
- Fraser, Kim. 2009. "ReDress - ReFashion as a solution for clothing (un) sustainability." Masters Exegesis, Auckland University of Technology.
- Gwilt, Alison. 2012. "Integrating sustainable strategies in the fashion design process: A conceptual model of the fashion designer in haute couture." PhD Thesis, RMIT University.
- Hamon, Jan. 2007. "New Zealand dressmaker: Experiences, practices and contribution to fashionability, 1940 to 1980." PhD Thesis (Monograph), RMIT University.
- McQuillan, Holly, Timo Rissanen and Julian Roberts. 2013. "The cutting circle: how making challenges design." *Research Journal of Textiles and Apparel* 17 (1):39-49.
- Molloy, Maureen. 2004. "Cutting edge nostalgia: New Zealand fashion design at the new millennium." *Fashion Theory* 8(4): 477-490.

Melrose, Susan. 2005. "Words fail me: dancing with the other's familiar". Key note address at *Towards Tomorrow? International Gathering 2005*. Aberystwyth, Wales, April 6-10.

Rissanen, Timo. 2013. "Zero-waste fashion design: a study at the intersection of cloth, fashion design and pattern cutting." PhD Thesis, University of Technology Sydney.

Schön, Donald. 1983. *The reflective practitioner: How professionals think in action*. New York: Basic Books.

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