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**Circular Design Futures**

Professor Rebecca Earley

**Introduction**

As the Design Journal celebrates its 20-year anniversary, the Textiles Environment Design (TED) research group at University of the Arts London marks a similar milestone moment. In this essay I reflect on the journey I have taken as a member of this staff cluster of textile tutors and practicing industry designers. TED was co-founded at Chelsea College of Arts by Emeritus Professor Kay Politowicz and Jackie Herald in 1996. It was formed to cultivate new knowledge about what we then called ‘green’ textiles, so that through evolving our own studio work we could support the students with this important issue emerging in our sector. (At the same time, at Manchester Metropolitan University similar ideas were being pursued by Jo Heeley through her Textiles Environment Network (TEN) initiative.)

Upon discovering that the synthetic materials that I loved to surface and manipulate as a print designer had created significant resource depletion, pollution and environmental impacts, my journey towards sustainable design research began. In contrast to working alone in my Brick Lane studio, the TED group provided an inspiring and informative environment in which to challenge myself both professionally and personally. By 2001 I chose to cease producing commercial textiles and accessories for my label, *B. Earley*, and instead take up a research fellowship at Chelsea to find new ways to design, make and manufacture materials, before going back into business with a textile collection that was the greenest I could create.

That research fellowship of course turned into a whole new career; for once you begin to scratch the surface of what man is doing to the planet, then there is no simple fix. There would be no easy answers to the research questions I learned to ask.

**Practice, Process & Community**

The first practice research projects included using recycled polyester (PET) to create heat-felted and photogram printed textiles, produced in fading sets that gradually used up the dyes I hand-applied to the printing paper - I called this *exhaust printing* (1998). With this technique I also created 100 ‘healing herb’-printed radio-therapy gowns for breast cancer patients, working in consultation with the nursing team who looked after the outpatients; and the very first *Top 100* recycled polyester shirts, over-printed with the weeds growing outside my studio (1999). Practice-based research was naturally the way I chose to engage both staff at students at Chelsea in this new culture.

For the first few years in the TED office the archive I set up had an open door policy each Tuesday – which meant that we could help students with their practice and theory projects in a different context to the studio projects we taught. I had imagined we would be researching a range of ideas for students, but at this time the weekly requests were almost entirely for help sourcing organic cotton and using natural dyes. Subsequently, during this era of ‘green’ textiles we built an archive based around supporting these requests, augmented in particular by our work at the Eden Project in Cornwall (1999-2001). This project, working with a UK-grown woad for indigo dyeing, was in collaboration with the *Spindigo* research scientists at Bristol and Reading Universities. Chelsea tutor and costume designer Gary Page and I researched ways to connect this native plant, its rich history and the dye extracted, to the visitor experience at Eden. We did this through story telling, costume, interactive workshops and performance.

These first research projects formed the foundations of the TED approach to research that we continue with today - exploring new materials and processes with lower environmental impacts, through developing internal and external collaborations with inter-disciplinary stakeholders, and engaging the user along the way. We were able to quite literally ‘grow’ the research culture of ‘green textiles’ by engaging with new processes through our practice research, and so form new research communities.

**Understanding Lifecycle Design**

The internal community of TED was where all the ideas began – time spent talking with each other and pursuing ideas through projects with the students. In 1999 I was introduced to the concept of the lifecycle of textiles by Kate Fletcher, TED’s first PhD research student. We connected initially through a forward-looking Arts Council grant awarded to makers who wished to invest time in a ‘change of direction’ (*Means of Production*, convened by Modus Operandi in London). Kate and I worked on several small projects that fused theoretical ideas from her thesis, *‘Environmental Improvement by Design: an investigation of the UK Textile Industry’*,with my practice expertise and visual communication approach, to create new insights for how textile design could contribute to lowering the impacts of fashion (*5Ways*, AHRC project, Earley & Fletcher, 2002).

After these inspiring translation projects with Kate, my ideas about textile design began to be more about practice-based research and the insights for design strategy; specifically looking for ways in which to combine several ‘sustainable design’ approaches at once. This need for research to be multi-directional – not just about the textile or material, but also the social and economic aspects - was further compounded by the research for the curation of the Crafts Council’s *Well Fashioned; Eco Style in the UK* exhibition (2006-7), which used the lifecycle framework to present the work of 21 UK-based fashion and textile designers.

Whilst the diversity on show was proof of a strong, emerging discipline, the lack of more sophisticated, systemic approaches amongst this generation signposted the need for fashion textile research to reach for the kind of joined-up thinking that *Cradle-to-Cradle* authors Michael Braungart and William McDonough suggested in 2002. Textile designers needed to be working with the technical and biological cycles so that resources could be reclaimed and thus used more efficiently – after all, this was the same generation that were experiencing the fast fashion phenomena on the high street. Fashion and textiles were about to change forever and researchers needed to get ready.

In 2010 we completed a large AHRC project (*Worn Again: Rethinking Recycled Textiles*) and the direction for the TED group was set; we would focus on the idea of sustainable textile design strategy together - through our diverse practice-based research - towards the circular economy for textiles. TED researchers explored ‘upcycling’ textiles by selecting recycled mono-materials and seeking to reduce all fabric waste during production; but we also developed low impact dye and print processes using digital, sonic and laser technologies. We explored ideas about multi-functional use, rental services and ‘take-back’, and long- and short-life product applications that differed between fashion and architecture. We had built a team at Chelsea, and our second PhD researcher, Dr Kate Goldsworthy propelled us forward into the next era – *designing textiles for recyclability* (Goldsworthy, 2012).

**From Sustainable to Circular Design**

The concept of planetary boundaries[[1]](#footnote-1), first introduced in 2009 by 28 internationally renowned scientists, identified and quantified the first set of nine limits within which humanity can continue to develop and thrive for generations to come. Crossing these boundaries could generate abrupt or irreversible environmental changes. Respecting the boundaries reduces the risks to human society of crossing these thresholds. In order to work within this framework, it is essential that cultures find ways to reuse existing resources – to create circular economies. Design has a key role to play here.

Design has been an important element of the resource-intensive production and consumption systems of the 20th Century. Design continues to play a significant role in the damaging impacts on natural systems and human populations throughout the textile supply chain. However, through the development of TED we have also seen that Design can be a transformative tool, building systemic change in the industrial system and as a powerful force to re-align current values, ethics and meanings.

Circular Design differs from Sustainable Design in that the objective is ultimately measurable - one either *closes the loop*, or one does not. Sustainability can be regarded as an abstract and fluid idea that many stakeholders find difficult to create targets for. It can mean very different things to different stakeholders. To close the loop however, the product or system keeps its resource use constant. Materials are kept in circulation in perpetuity. In creating circular systems and products new social innovation models, communities and businesses may be created, and work together towards a common goal. This changes the role of the textile designer to one in which systems, collaboration and communication is included; quite the opposite of the traditional image of the textile designer as one who works in solitude on a collection of samples in the studio.

Design researchers need to work with circularity principles through engaging directly with materials, technology, business challenges and user needs. Key organisations like the RSA and Ellen MacArthur Foundation recognise that design needs to become circular:

## *At the RSA Great Recovery we believe design can make things better. It has the power to turn waste into value, and reduce environmental impacts through system thinking. Everybody has the power to rethink and redesign the world around them, we just need the right insight and tools.*

*A circular economy is one that is restorative and regenerative by design, and which aims to keep products, components and materials at their highest utility and value at all times, distinguishing between technical and biological cycles. Companies need to build core competencies in circular design to facilitate product reuse, recycling and cascading. Circular product (and process) design requires advanced skills, information sets, and working methods.*

**Models & Tools**

Circular design as an emerging field needs new frameworks and tools to help others establish innovative solutions across sectors. Using TED’s *The TEN* – the design tool that resulted from the Worn Again project - we considered the lifecycle of the product, the man and machine involved with the product, and the scale of the impacts. The tool was made into a set of cards in 2011, and was rapidly taken up by designers in industry and education alike. The TEN represent the turning point for the group; a catalytic moment where our design research turned our practice insights into a strategic framework that connected us to a whole new world of collaboration. In time, this framework began to offer TED researchers the opportunity to extend circular ideas across fields and disciplines, whilst remaining grounded in a deep knowledge and understanding of material journeys and the way in which they can enable a better future. The great potential we felt was in bringing together all kinds of designers whilst continuing to collaborate widely outside of our disciplines, across industry and governance.

One of the main outcomes of TED’s Mistra Future Fashion project in phase 1 was a framework for sustainable textile design research which mirrored these ideas and added detail through the insights gained from action research and practice-based projects. The *Materials, Models and Mindsets* framework was developed by Kate Goldsworthy through the curation and making of exhibits for the *Textile Toolbox* exhibition in collaboration with PhD researcher Clara Vuletich. The framework guided the final outcomes for the project and the inner trefoil shapewas used to create recommendations for future research; and from these recommendations the format for the *Circular Transitions* Conference (2016):

*Material Systems*

*Design which responds to technology, science, material developments: challenges and benefits of new modes of production; opportunities for cleaner processes in the textile materials value chain; innovation in textile recycling technology; potential for digital tools and processes to enable a circular economy; tracking and tracing solutions in a complex material recovery industry.*

### *Social Models*

### *Design for systems, services, models, business, networks and communities: New modes of consumption; disruptive business models; speed of product and material cycles; appropriate design; design of products for the technical and/or biological cycle; projects that explore successful industry / academic collaboration and also tensions between our traditional modes of competition and collaboration; design creating more social equity within the circular supply chain.*

### *The Self & Mindsets*

### *Design of behaviours; tools, frameworks and experiences to enable and support collaboration, mindset change and improve decision making: physical tools for facilitating collaboration across disciplines; pioneering and enabling the changing role of the designer in a circular economy; tools for designers to support the mindset and behaviour change of consumers; design approaches towards well being that develop circular cultures; opportunities for designers to bridge understanding of scientific tools (such as Life Cycle Assessment).*

**Industry, Facilitation Methods & Leadership**

Kate Goldsworthy’s policy paper for the Environmental Audit Committee, *Growing a Circular Economy* (2014), set out a number of the key challenges and opportunities for design to address in the near future. Designers need to understand end-of-life processes and be able to eliminate barriers to recycling through design decision-making; they need to design-in future circularity opportunities and adopt a more ‘pro-active’, systems-based approach that truly ‘closes the loop’; designers need to understand how to engage consumers and change their use and waste disposal habits; designers need to recognise new business opportunities in remanufacturing that make these ideas economically attractive.

In 2010 we began working with H&M – taking TED’s The TEN to them to develop their sustainability approaches in their *Conscious Collection* work. What we quickly understood was that whilst they were eager and enthusiastic about developing sustainability approaches, their scale and inter-departmental organisation prevented them from fully utilising their design teams in this commitment. The division geographically and focus-wise between the buying office (Sweden) and the production office (Asia) created tensions that were at once both a barrier, and their biggest opportunity for a more design-driven sustainability agenda.

To begin to realise these barriers and opportunities, the textile design research team at TED needed new tools and skills. A framework for textile design research with a sustainable agenda had been constructed over many years in TED; from both practice-based creative research and more recently social science research. Qualitative research methodology uses a ‘bricolage’ approach (Denzin and Lincoln 1994:2), which “calls not on the power of rationalisation and methodological examination, but on the power of human imagination and open-minded exploration” (Walker 2013). Through working on sustainability projects with fashion and clothing brands we learned about action research - fundamentally a change-process, where the researcher consciously studies something in order to change or improve it (Berg 2007). Researchers work directly with participants as co-researchers, in an iterative cycle of learning, reflection and action. Participants produce prototypes and build new knowledge together with researchers, in collaborative methodologies such as co-design and participatory design. At H&M we co-designed products with improved Higgs Index scores using the first five of TED’s The TEN, with worksheets and score cards designed for purpose. The highest scoring products were those that were created from recycled materials and were made to be taken back and reprocessed (recycled again).

For academic textile design researchers working towards sustainability, new models and processes need to get used and applied. Researchers will need to create embedded situations and use systems design and management consultancy skills to negotiate a change process. For this to happen we must be more than the sum of our parts. Our collaborative network has evolved overtime through TED; through venturing into industry and new contexts a map has formed that demonstrates strong connections at an international level with the academic, industry and public sectors – at TED the researchers now feel that without collaboration with industry, their research is not at its best.

**Conclusion**

TED grew from the ground up, by meeting the needs of the people it served – the textile staff and undergraduate students. Over time, this extended to include MA and PhD students and associate researchers. TED researchers are lecturers, practice-based designers and makers, who have evolved into design academics through a combination of all of the above approaches and activities.

The HEFCE model for high-performing research units (2015) puts people in the middle of the centre, surrounded by strong leadership, culture and values. In a recent conference paper, *Whole Circles* (Earley 2016), I built on this by reflecting upon my experience as the Director of TFRC, to identify insights to support leaders of other design research communities. New leadership approaches are needed to guide designers into taking on non-traditional roles in the textile field; collaboration and communication skills are not always easy to teach to materials experts whose world revolves around the tactile and sensio-aesthetic.

We can design and lead research to create more resource efficient models in order to plan future material loops and circularity. We can engineer new processes and systems which will require designers to embrace these expanded roles. In a keynote talk, *The ‘i’ in the Textile Team* (Earley 2014), along with the article, *A New ‘T’ for Textiles* (Earley *et al*, 2016b), I argue that design researchers and educators need to extend the curriculum to include supporting self-development along with a broad sustainability agenda.

In addition to this, the making of new materials, samples and prototypes continues to be where we can make a substantial difference. The field of circular design has emerged in recent years as a framework and model for collaborative efforts (from industry, academia and governments) to bring us closer to circular material flows. It is widely accepted as our most promising strategy for keeping within planetary boundaries as well as offering economic as well as social benefits. At TED we are currently creating new guidelines for circular design through practice approaches, materials exploration, action research and cross disciplinary projects, which will be underpinned by scientific research that had been conducted by our design-science partnerships.

By 2019 we will have produced circular garments for global retail with Swedish brand Filippa K; we will be publishing guidelines for circular design, developed, tested and underpinned by life cycle assessment insights from our science partners. We see circular design, making and collaboration with science and industry partners as fundamentally important for the future of all materials design research. At TED we are contributing tools, methods, frameworks, products and guidelines to realise this future, at scale, with industry.

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1. ***Planetary boundaries****is the central concept in an Earth system framework proposed by a group of Earth system and environmental scientists led by Johan Rockström from the Stockholm Resilience Centre and Will Steffen from the Australian National University.* [↑](#footnote-ref-1)