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Playing for Time: seven practice-led workshop tools for making design decisions to extend the life of fashion textile materials and products

Earley R. and Goldsworthy K.
University of the Arts London, UK

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Abstract: Since 2011, the authors have been developing creative and playful sustainable design workshop tools to understand, develop and share knowledge and ideas with other designers. These tools originated through practice-led research methods, involving prototyping, to explore and consolidate research theories. By translating design strategies into both realised artefacts *and* tools for engaging others through design, the authors have continuously transformed practice and theory in the field. More recently the theory has become focused on the starting point of 'circular models for design', in particular, designing for lifecycle speeds. This paper discusses some of the tools used for exploring 'product longevity' and 'circular', resulting in further insights for future design, including the current understanding of 'longevity' as both a product and a material consideration, with two seemingly opposed strategies. The authors research groups' primary methodological approach is through designing and making textile/fashion artifacts to generate new theory; in order to share this approach and support others outside of the group to use making as a key research method they often design and facilitate workshops and create tools, which are then shared via the project website. In this paper tools developed specifically to design to extend the life of a fashion textile product are discussed and the creative outcomes generated are presented. The playful tools generated playful ideas and by reflecting via field notes on these industry workshop outputs the authors here offer a set of tools to support designing sustainable and circular textiles for long life.

Introduction

This paper presents seven design tools developed to support fashion textile designers make decisions around materials and product that potentially extend the life of the garment. The assumption was that the use of playful tools and the co-creation of new design concepts in workshop sessions can lead to new understanding and insights about longevity and fashion textile design.

Methods

In this project work the authors further developed their methods to align closely with two practice-based design research frameworks for sustainability - Walker (2013) and Goldsworthy (2012). They comprise three similar stages – *thinking/theorizing; designing/making;* and *reflecting/sharing*. Both frameworks are based on the solo researcher designing and creating textile artifacts and focus on the iterative and experimental aspects of working with materials, form and process; as well as the intimate relationship between thinking, making and writing (Earley *et al* 2016:35-37). For this paper, the tools that were designed by the authors enabled designers from a range of backgrounds - who were participants in workshops – to create a design concept on paper for a product with an extended life. The seven tools have been reviewed by the authors through field notes and photographs taken at the time. The insights from each tool have been drawn into summary form to highlight the contribution each makes to longevity design for fashion textiles as product or material.

Phase 1 'Baseline' Tools

During the project period 2011-2015 the authors explored tools which contextualised their research into 'sustainable design strategies' and also provided 'enabling tools' for ideation and design action in a commercial environment. These enabling tools were used to redesign existing fashion textile products.

Author 1's playing cards (Figure 1) were used to encourage participants to think holistically about sustainable design, before focusing on approaches that would lead to the greatest improvements when assessed using the Higgs Index (Sustainable Apparel Coalition, 2012). The cards were introduced to participants through a talk from author 1, and through watching short animations created for each of the ten approaches (Textiles Environment Design, 2013). A series of tasks were set which challenged the participants to think of a design decision, based on the card played to them, that would lead to a product with a lower environmental impact.

Figure 1. Tool 1 – Earley & Politowicz's *The TEN* : design strategy cards.

The process began with the original garment being recorded through an object analysis process on to the left-hand side of the Redesign Worksheet (Figure 2). This allowed the participants to create a baseline for the product, which in some cases was used to also generate a score using the Higg Index (Sustainable Apparel Coalition 2012). Next, the redesign ideas were recorded on the right-hand side of the Redesign Worksheet.

The Checklist (Figure 3) enabled participants to double check that their changes had not created problems for later – like chemicals that are hard to recycle, for example.

These are baseline tools that build the designer's understanding about making design decisions and choices by separating them out; and then understanding the impact created when making different decisions. In this phase of the research it was noted that the 'circular' recycling redesign concepts all resulted in the biggest score change. This then lead the authors to understand that tools were needed to explore the contexts around design for recycling in more detail - in particular material and product speeds.

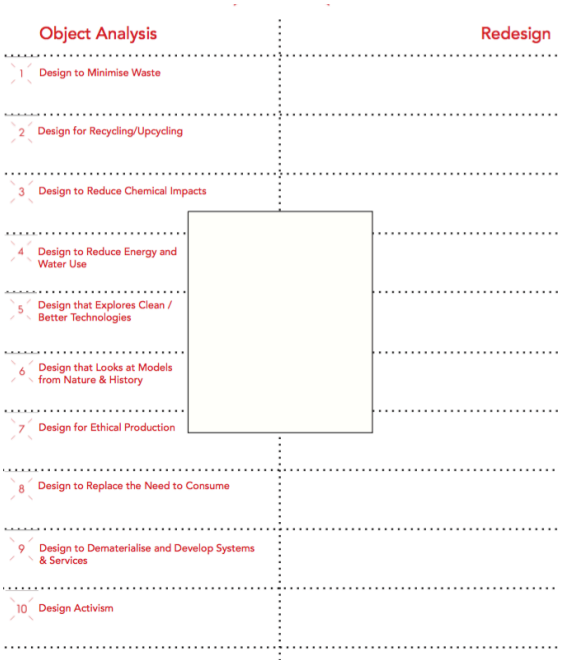

Figure 2. Tool 2 - The Redesign Worksheet (Earley 2013)

Figure 3. Tool 3 - The Checklist (Earley 2013).

Phase 1 Creative Outputs

The phase 1 workshops generated over 60 redesign concepts over an 18-month period. All concepts pursued material or product longevity – the idea of 'short life' was not considered as an option by participants as the worksheets being used specifically asked them to build in extended life thinking.

Figure 4. '**Family Jeans'** a pair of denim jeans designed to last a lifetime, using low impact textile considerations and biodegradable materials to bury at the end of life. (Earley *et al* 2016:81)

Figure 5. '**Mono-material Dress'** working with the latest recycling technology to reprocess the minimal-waste, mono-material polyester garment. (Earley *et al* 2016:82)

Figure 6. '**Wool Blazer'** a long wear and multiple-owner garment with low wash credentials, using recycled material and a design that will allow longevity and 'passing on'. (Earley *et al* 2016:83)

Figure 7. '**Cable Jumper'** connects strategies for local low impact and ethical manufacture with mending and rental services, it requires low wash and has possibilities for mono materiality with the reuse of the yarns in another garment, or within the garment itself. (Earley *et al* 2016:84)

Phase 2 'Lifecycle Speed' Tools

These tools ultimately reflected the developing personal practice of the authors, which in phase 1 of the Mistra Future Fashion Programme, culminated in prototypes and an exhibition (Earley & Goldsworthy 2014). The insight was that several design paths lead to 'longevity' including the unsurprising emphasis on 'product longevity' and 'extended use through multiple users'; but more surprisingly design concepts which focused on seemingly 'short life' products with a circular materials model which resulted in an equally long-term use of resources - albeit through multiple product reincarnations. As the project moved into phase two tools were developed which reflected this departure in the thinking around designing circular products.

The framework for Phase 2 had moved from 'sustainable design' to a more focused 'circular design' strategy. This in turn focused the tools into Life Cycle Thinking (LCT) aids. One of the first challenges was to express 'speeds' relating to circularity with a 'whole lifecycle approach'. Several tools were developed to aid design ideation of short-life and long-life textile products. After a review of existing 'slow design' strategies (Goldsworthy *et al* 2017) it became clear that the discourse around 'speeds' often related only to the production and use phases. The following workshops were designed to interrogate and question this assumption in order to find insights based on a whole-cycle view.

The purpose of these tools was often to express a complex set of scientific insights into a form which could quickly communicate starting points for design briefs. They continue to develop through every testing and iteration, and revealed several contradictions and complex relationships between each stage of the lifecycle.

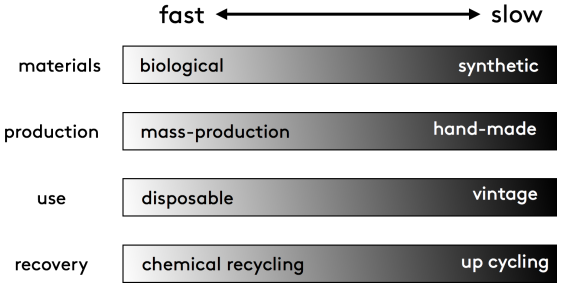

Figure 8. Tool 4 - Lifecycle Sliders was a framework for assessing 'longevity' and 'speeds' with a lifecycle perspective. (Goldsworthy 2017: S1964)

The Lifecycle Sliders were used initially with a group of Masters students at UAL who were asked to research and analyse a selection of textile products according to the lifecycle stages along the sliders. Each plotting was completed in discussion with the whole group so that insights could be shared. Insights resulting from the workshop included;

- discussion around raw material speeds which concluded that renewable annual crops such as cotton were in fact 'fast' compared to the oil based synthetic which take thousands of years to form.
- that recycled synthetics (such as recovered PET) could be considered 'fast' as the conversion process was much shorter and less impactful than polyester made from virgin raw materials.

Figure 9. Emerging Designers Workshop. The Lifecycle Sliders were used as a teaching and brainstorming tool with current MA students at UAL, Dec 2016.

These tools were developed further for use in a series of workshops which were designed and took place in three cities, using four typologies from phase 1 LCA research (Roos *et al* 2015) – a polyester shirt, an outdoor jacket, a t-shirt and some jeans.

The workshop aimed to challenge participants on their understanding of the circular textiles economy, through exploring its application in the fashion industry and learning what industry leaders are doing, before using their experience to redesign products around different lifecycle timeframes – from fast to slow. The day included using author 1's Design Strategy Cards with a focus on the product typology card selected by each group. After this the facilitators gave a slide talk about the notion of fast, and intentionally speeding up a product's lifecycle.

A task was then given which was based on each group selecting a Speeding Ticket, which gave them a specific time frame to aim for. After sharing insights around this fast product, another slide talk gave a perspective about slowing down the circular lifecycle. Groups then selected a second Speeding Ticket which gave them the slow pace to aim for, and the design ideas were then shared for a final time.

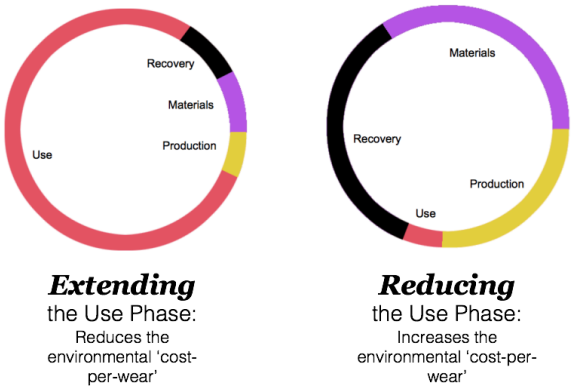

Figure 9. Tool 5 - Speedcycle was developed as a tool to express the complex relationships between different parts of the lifecycle and present a 'cost per use' model used by environmental scientists to designers. (Goldsworthy 2017).

Lifecycle representations rarely communicate any proportionality in speed or timeframes. When trying to design within a specific context this becomes problematic and misses vital elements for consideration. If represented in models which do try to communicate a different set of journeys relating to speed, one can immediately see the tensions which shift with each story.

'Speed' can be translated in very different ways if related to different parts of the life-cycle and often a product can therefore have multiple and often counter-intuitive mixes of speeds within a single product.

Figure 10. Tool 6 - The Speedometer was designed as a worksheet based on the speedometer of a car, to help teams of participants to work create products for both fast and slow cycles (Earley 2017).

Figure 11. Tool 7 - The Speeding Tickets were a set of briefing cards issued to teams in order to provide them with a target speed. (Earley 2017)

Phase 2 Creative Outputs

During four workshops in three countries with 56 participants, 24 new design concepts were created. This section highlights three that explored longevity for: a pair of denim jeans; an outdoor jacket for children; and a polyester bridesmaid dress. The use of the tools through half-day and whole day workshops lead to concepts which demonstrated a high level of creativity in terms of material innovation, garment cut and construction, service design and the overall narrative (Earley 2017: 2654-2655).

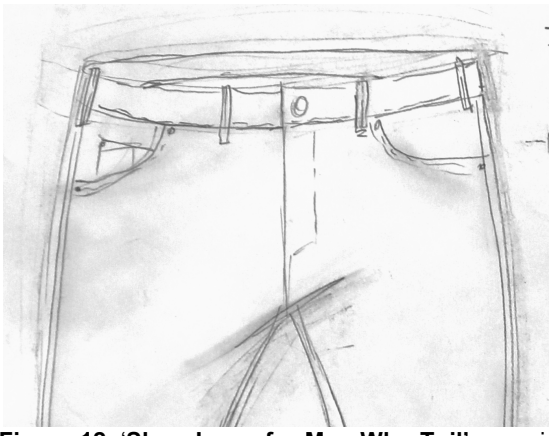

Figure 12. '**Slow Jeans for Men Who Toil'** - a pair of jeans that focused exclusively on the historical context of the oldest denim jeans in the world which are 137 years old; encouraging longevity ambitions through reinventing traditional local processing and construction and a highly developed narrative platform to engage users.

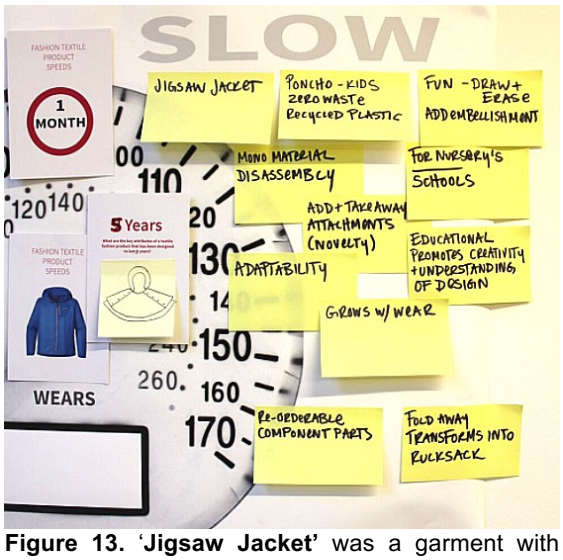

Figure 13. '**Jigsaw Jacket'** was a garment with detachable and interchangeable (disassembly) parts, based on a kid's poncho shape. Made from recycled polyester this a monomaterial jacket grows as you wear it and users can order component parts. The user was imagined to be a kid's nursery school which subscribed to this jacket through a service provider.

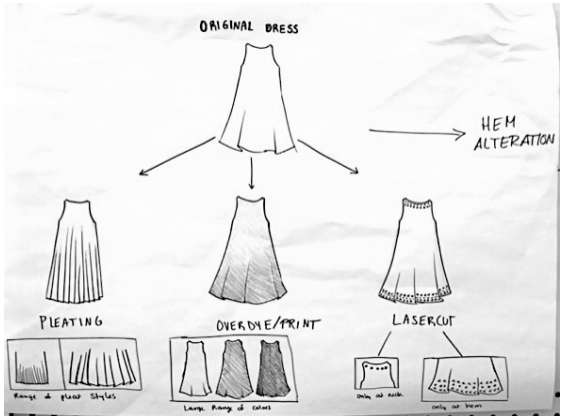

Figure 14. 'Maid-Make Dress' is a high-end bridesmaid dress that builds on emotional durability potential and becomes a bespoke special occasion item. The dress is connected to a service that transforms the garment after the wedding – giving the user two more 'looks' for special occasion wear before cascading down the market levels and final end-of-life processing takes place.

In this next section, we summarise each of the tool types in terms of how they were used to make decisions about a fashion textile material or product during the design specification stage.

Baseline Tools

1 - The Strategy Cards

Cards 1-5 aided the designer in making choices towards more durable materials; with card number 2 being the used to consider 'circular' materials that remain in use indefinitely through being reprocessed. Cards 6-10 supported aspects of the product in terms of durability achieved through traditional, historic approaches; provenance (quality & ethical considerations); service design to support long use; design activism to message habit change.

2 - The Redesign Sheet

This tool helped the designers identify what the current material was comprised of, and gave them worksheet space to propose material attributes that may lead to extended life. This tool also helped the designer identify what the current desired fashion product is comprised of beyond the material (cut, sew, trims, etc.), and gave them worksheet space to propose product attributes that may lead to extended life.

3 - The Checklist
This tool enabled the designer to check that the redesigned material would meet a particular set of requirements – for example, had the change made to the material to achieve longevity (a coating, for example) lead to the material being harder to recycle or reprocess?

This tool also enabled the designer to check that the redesigned product would meet another particular set of requirements – had the change made to the product to achieve longevity (a reinforced area made from a different fibre type) lead to it being harder to recycle or reprocess?

Lifecycle Speed Tools

4 - The Lifecycle Sliders
This tool initially served as a framework to guide thinking about a product journey in terms of speeds at different points of the lifecycle. It enabled in depth conversations about raw materials, their 'renewal timeframes', the various processes needed for each material in production alongside scenarios relating to the use and recovery phase. By visually mapping in this way participants were able to see where more appropriate choices might be substituted and where there were obvious mismatches. For example, a very high impact, slow material like polyester being used in short life, low quality fashion products.

5 - The Speedcycle
This visualisation of the lifecycle with proportionate representation facilitated understanding of the interrelatedness between cycle stages and impacts. It was designed to illustrate the environmental science standard of 'cost per wear' and was effective in modeling the impacts of short vs long life across the cycle. In future iterations, there may be benefits in including 'scale' of cycle as a further comparative dimension.

6 - The Speedometer
This tool enabled the designer to understand the current speed of the material and product, by drawing upon their existing knowledge of garments they know well through personal ownership and use. The tool gave them insight into how the length of ownership versus number of uses can work in making a design decision.

7 – The Speeding Tickets
Once a baseline for current material and product speed had been established the Speeding Tickets were used to set the designer the challenge of designing to extend material and product life by a specific number of months or years. This tool led to new insights about how design decisions change according to precise timeframes.

Next Steps
Design concepts will be developed through a strategic project with Filippa K; exploring the concepts of material and product longevity through workshops alongside the development of design research artefacts which further express the theory. Tools and analysis methods will be further honed during this process with the intention of producing 'longevity guidelines for design' at the end of the project in 2018.

Acknowledgments
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References
Earley, R. and Goldsworthy, K. (2014) *The Textile Toolbox* exhibition, http://www.textiletoolbox.com/ <accessed 27.1.12>.

Earley, R. et al (2016) *The Textile Toolbox: new design thinking, materials and processes for sustainable fashion textiles*, project report for Mistra Future Fashion

Earley, R. (2017) *Designing Fast & Slow: exploring fashion textile product lifecycle speeds with industry designers.* 12th EAD Conference, Design Journal, 20:sup1, S2645-S2656.

Goldsworthy, K. (2012) *Laser-finishing: a new process for designing recyclability in synthetic textiles.* PhD thesis. University of the Arts London.

Goldsworthy, K. (2017) *The Speedcycle: a design-led framework for fast and slow circular fashion lifecycles'.* 12th EAD Conference, Design Journal 20:sup1, S1960-S1970

Goldsworthy, K., Earley, R. and Politowicz, K. (2017) *Circular Speeds: a review of fast and slow design approaches in the fashion and textiles industry*, report for Mistra Future Fashion.

Roos, S., Sandin, G., Zamani, B., Peters, G. M. (2015). Environmental assessment of Swedish fashion consumption. http://mistrafuturefashion.com/wp-content/uploads/2015/06/Environmental-assessment-ofSwedish-fashion-consumption-LCA.pdf. <accessed 27.1.12>.

Sustainable Apparel Coalition (2012) Higgs Index. Available at: http://www.apparelcoalition.org/higgindex/ <accessed 27.1.12>.

Textiles Environment Design (2013) *TED's The TEN animations, www.tedresearch.net/teds-ten/* <accessed 27.1.12>.

Walker, S. and Girard, J. (2013) (eds.) *Handbook of design for sustainability*. Bloomsbury Publishing: London, pp.446-4