

## Title - 2D/3D/2D: A Diagnostic Approach to Textile and Fashion Research Practice

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### Introduction

In the School of Art and Design, at Nottingham Trent University, a range of research methods and practices have been developed by the 2D/3D Research Group led by Dr Amanda Briggs-Goode and Dr Katherine Townsend. The group's research focus is on the potential new design relationships and strategies that can be devised by exploring 2-dimensional textile design and 3-dimensional garment shaping techniques in conjunction with new technologies and sustainable concepts. This paper documents recent a diagnostic research project undertaken by the 2D/3D Group, with specific focus on No Waste approaches.

### Research Context

The creative, experimental research focus of the 2D/3D Group builds on a series of individual PhDs researching the influence of CAD/CAM on fashion and textile design, focused on: repeat pattern (Bunce 1993); photographic imagery (Briggs 1997); colour (Leak 2001); non-repeating pattern (Carlisle 2003) and the relationships between 2D surface design and 3D garment shapes (Townsend 2004a). Initial experimentation into 2D/3D by Townsend (2001) and Briggs and Bunce (2001) culminated in a group project and exhibition Transforming Shape in 2001. The digitally printed and embroidered textile outcomes of the project created by Amanda Briggs-Goode, Gillian Bunce, Rosemary Goulding and Katherine Townsend explored the relationships between innovative surface imagery and three-dimensional prototypes, based on the fundamental geometric forms of circle, square and rectangle. The hybrid nature of the practice, whereby hand and digital methods were synthesized through individual and collaborative approaches was also significant at this time (Briggs-Goode 2006, Townsend 2004b).



Figure 1: Image taken from the Transforming Shape exhibition (2001) Bonington Gallery © NTU 2001.

Townsend's practice-led PhD research led to the development of a Simultaneous Design Method for the origination of 2D textiles and 3D garments using integrated CAD/CAM, inspired by the practice of Sonia Delaunay (Townsend 2001). Sculptural, Architectural and Hybrid garment shape criteria were also identified in order to correlate generic styles of surface design with different garment shapes and fashion silhouettes.

'With sculptural shapes, the often, complex manipulation of cloth on the form can constitute both garment and surface decoration. Architectural garment shapes elicit a much more secondary, decorative approach that supports a more defined structural form. Hybrid shapes can work much more simultaneously, with the 3D garment shape acting as the catalyst for mark making or vice versa' (Townsend 2004b).

The Sculptural, Architectural and Hybrid definitions and the advantages of working collaboratively were revisited as the starting point for a long term research project in 2009, leading to the formation of a larger 2D/3D collaborative group, encompassing staff from across the Fashion, Knitwear and Textile subject. This paper documents some of the early aims, experiments and outcomes of this evolving group carried out between September 2009 and January 2010.

## **Project Aims**

The key aim of the 2D/3D collaborative project is to consider how designers from different disciplines approach 'designing'. Fashion and textile design are closely linked, in fact inseparable in industry, through CAD/CAM technology encompassing graphic software through to garment prototyping, enabling designers to integrate 2D and 3D outcomes. Fashion and textile design are also connected through their educational proximity in art schools, but are essentially different practices - with a range of different design methods, processes, traditions, tacit knowledge and design applications.

A considerable amount of the undergraduate fashion and textile curriculum is focused on the acquisition of specific craft skills (Briggs-Goode 2007), which are often hidden within disciplines, but are of immense value when shared with specialists from other areas of practice as tools for creative problem solving. This is recognized in postgraduate education, where the subject boundaries may be deliberately eroded throughout master's study to encourage a re-evaluation of design approach and context to foster innovation equipped with new found knowledge of the wider creative industries (Jones & Townsend 2008). Similarly, the 2D/3D group project was established to dissolve the hierarchies of fashion production by reversing and revealing how the creative process can be instigated from a 2D, 3D, or deconstructed starting point. The process of documenting and analysing how textile and fashion designers can work together collaboratively is therefore a fundamental and integral part of this ongoing research process.

In addition to this overarching focus, other important aims were to creatively explore sustainable and technological approaches practically. Research into sustainable design is well supported at NTU, but communicating ethical strategies practically as well as theoretically is recognized as being most effective way of embedding No Waste and Re-Use strategies. This pedagogic focus builds on research undertaken by staff and research students (Pittman & Townsend 2009, Lochren 2010, Townsend & Chon 2010).

Similarly, the aim of developing cutting edge technological design approaches builds on research into the integration of fashion and wearable technologies (Briggs-Goode et al 2009a, Briggs-Goode 2009b, Breedon

et al 2008) and the use of digital textile and motion capture technology to inform design outcomes (Townsend et al 2009, Paramanik 2008).

## **2D/3D Project Development**

The first stage of the 2D/3D (2009) project involved the organization of academic staff from Textile Design to team up with others from Fashion and Knitwear Design, to work closely on a series of surfacing and shaping experiments, in order to explore potential 2D to 3D working methods. Through a series of meetings between October and December 2009, discussions centered on Sculptural, Architectural and Hybrid garment shape criteria and the formulation of research questions into how 2D surface approaches can be integrated with different 3D fashion constructions to generate new design methodologies and outcomes. The initial investigations involved print, embroidery, knitted textile specialists working with fashion/knitwear designers working with pattern cutters together in small multi-disciplinary teams. Questions emerged around:

How No Waste principles linked to sustainability can lead to innovative design approaches and outcomes?

How the affects of physical movement can influence the design of new textile and garment forms?

How new relationships between 2D and 3D design constructs can be forged?

The identification of these three key areas of investigation were informed by individual research interests within the group, underpinned by local and global design concerns from an educators and practitioners perspective. This resulted in a clear focus for both a diagnostic and longer term collaborative research project. Multi-disciplinary groups began to form around three different approaches to the relationship between 2D and 3D: Group 1 - where a 2D approach would lead developmental work; Group 2 – where 2D and 3D developments would be worked on simultaneously, and Group 3 where a 3D approach would lead the design process.

From the range of concepts identified in discussions, it was decided that Group 1 would utilize the No Waste concept whereby cutting and construction is designed to eliminate waste of material and increase sustainability. Group 2 would explore Movement and Form – by considering how the body is evaluated through movement in textiles (and visa versa) using strategic cutting, shaping and manipulation of specific cloth shapes to facilitate and restrict physical activity and expression. Group 3 would investigate Readymade Garments by taking 3-dimensional vintage garments as a starting point, in order to examine how new pieces could be created by deconstructing, recycling, up-cycling and creating new designs that combined disparate details and volumes.

## **Experimental Practice**

A development day of 'play' was organized in January 2010, allowing cross-disciplinary groups to come together in a studio space to work collaboratively on the ideas discussed earlier. The groups were provided with calico (traditional toiling fabric) as well as other contrasting draping qualities including lightweight and heavy plain woven's, jerseys, and digitally printed lengths on a range of natural and synthetic substrates. Sketchbooks, reference books and notes from previous meetings were on hand to inform the process. The workshop day was undertaken in part of the Fashion studio with access to cutting tables, mannequins and

manual technologies only, in order to foster creative thinking through experimentation, as opposed to producing a tangible set of completed garment outcomes. Early on in group dialogue, there was a shared recognition that the notion 'research through action and reflection' (Schon 1991) was the most appropriate method for the group to adopt in view of the strong professional design skill base of the group members. The notion of creative experimental research (play) was considered as important, leading to specific focus for the first workshop on the use of traditional hand skills (drawing, modeling, draping, hand sewing) with plans to explore emerging ideas using a wider variety of more advanced digital technologies in the future.

In view of the collaborative design focus of the project, an 'artistic' methodology was adopted which facilitated a pluralist, multi-method approach. This would allow the research to be driven by the requirements of the practice and outcomes resulting from a combination of a qualitative, naturalistic and reflective enquiry (Gray and Malins 2004).

After an initial briefing the groups began working together creatively with pen and paper and practically through manipulating cloth and existing garments on mannequins and staff working as live models. Research assistant, Catherine Northall and Design and Visual Culture lecturer, Lorriane Warde were able to record information from the groups as they worked by note taking, photographing work in progress and asking questions. Aspects of the session were filmed, particularly the experimentation by Group 2, which was primarily focused on the influence of movement.

The following sections detail the theoretical research undertaken by the wider group into No Waste, the practical research undertaken by Group 1, with analysis of some of the findings.

### **Research into No Waste Garments and Approaches**

The Japanese or Chinese kimono, like the Indian sari is an ingenious 'no waste' garment prototype, with the length of fabric traditionally woven to specific dimensions. Kimonos are traditionally made from a single bolt of fabric called a Tan, measuring around 14 inches (35cm) wide and 12½ yards (1130cm) long. The finished kimono consists of four main strips of fabric—two panels covering the body and two panels forming the sleeves—with additional smaller strips forming the narrow front panels and collar (Dalby 2001). The Indian Sari varies in measurement between regions and castes, but the contemporary versions usually measure around 600cm long by 120cm wide and are often folded in a specific Nivi style, from right to left around the woman's body (Miller 2010). Preceding both these garments, the Greek chiton, or toga was woven to order and based on a width of cloth measuring the wearer's height by a length measuring three times that measurement. This would result in dimensions of five by fifteen feet for a 5ft person.

Mario Fortuny's Delphos, introduced in 1908, was a modern interpretation of the chiton. Fashioned from a tube of heat treated silk, the garment required minimal cutting and finishing and was an early 'universal dress' which could expand or contract to accommodate most body shapes. Some of Issey Miyake's early Pleats Please garments, first presented in 1993 embodied many of the principles of all traditional garment forms listed above, and were accompanied by instructions on how to be wrapped in different styles around the body. The APOC (A Piece of Cloth) launched in 1999 presented the wearer with a woven length engineered to be cut along suggested outlines into a capsule wardrobe to be worn or wrapped around the body, without

sewing. In 'Green Fashion: Why Now?' Timo Rissanen presents three approaches to minimum waste that can improve upon the 10-20% waste created through traditional 'cut and sew' fashion production methods: 'fully fashioned', encompassing whole garment and integral knitting and weaving; A-POC, developed by Issey Miyake and Dai Fujiwara in the late 1990s, enlisting similar technologies and his own 'jigsaw puzzle' design approach, which refers to cut-and-sew that wastes no fabric (Hehorn & Ulasewicz 2008: 187-9).

### **Group 1: No Waste – 2D Lead**

The No Waste – 2D Lead concept was explored by a cross-disciplinary group consisting of three textile designers: Tina Downes (Embroidery), Amanda Briggs-Goode and Katherine Townsend (Print); a pattern cutter, Maria Stafford, a fashion designer, Julie Pinches and a fashion knitwear designer Cathy Challender.

The designer collective began working from a 2D perspective with two inkjet printed (with reactive dyes) 3 metre lengths: Blossom 1 (300 x 150cm) a repeating length of cotton sateen, designed by Briggs-Goode and Water Course (144 x 300cm) an engineered image on semi-transparent silk organza designed by Townsend. The use of 3 metre lengths of cloth within the No Waste group was based on the standard measurement of a sample textile and basic dress length and considered as a minimum realistic amount to fashion a contemporary dress from. The allowance was also informed by the zero-waste ideas explored by Rissanen, but instead of designing a jigsaw of interlocking pieces to use the whole cloth, the entire textile length would be used through manipulation on the form. Working within these parameters placed considerable constraints on the fashion designer and pattern cutter, normally used to selecting their own design and measurement of textile.

### **Blossom Dress**

The strong graphic design of the Blossom 1 length and limited amount of material predetermined a fairly streamlined cut with limited scope to explore complex cutting or volume styles. Instead of sketching, which would be the usual starting point, both the garment designers worked directly on a live model with a view to cut sympathetically around the print, with no fabric being removed from the full length and width of cloth. Particular attention was paid to the diagonal placement of the blossoms and strategic cuts were discussed to direct the draping style of the resulting silhouette.

Following experimental manipulation the cotton sateen length had three cuts made across the width of the fabric, corresponding to the placement of the print. The cut length was then explored directly on the dress stand. The geometric shape was predetermined by rotating the length by 90 degrees and cutting vertically which together with the contrasting floral imagery suggested a basic kimono shape.



Figure 2: Figure 4: Blossom Dress – Initial cutting and draping of printed length © Catherine Northall 2010.

The 'T' shape was easily configured from the way the fabric was cut, combined with the weight and drape of the cloth, which did not suggest contemporary fashion shapes. Instead, the visual and structural references suggested by the emerging garment resonated with the historical shapes of kimono and toga, although the amount of fabric involved was considerably reduced. While the kimono is worn close to the body the volumes involved and addition of an obi in Japan, result in a 'architectural' garment. The toga was historically draped and manipulated more closely to the individual body shape of the wearer, so was more 'sculptural' in shape. The Blossom dress intersected both these styles through its architectural characteristics of strong, rectangular, geometric lines, reinforced by large scale graphic imagery, subverted by the sculptural reliance on the form, resulting in a hybrid garment shape.

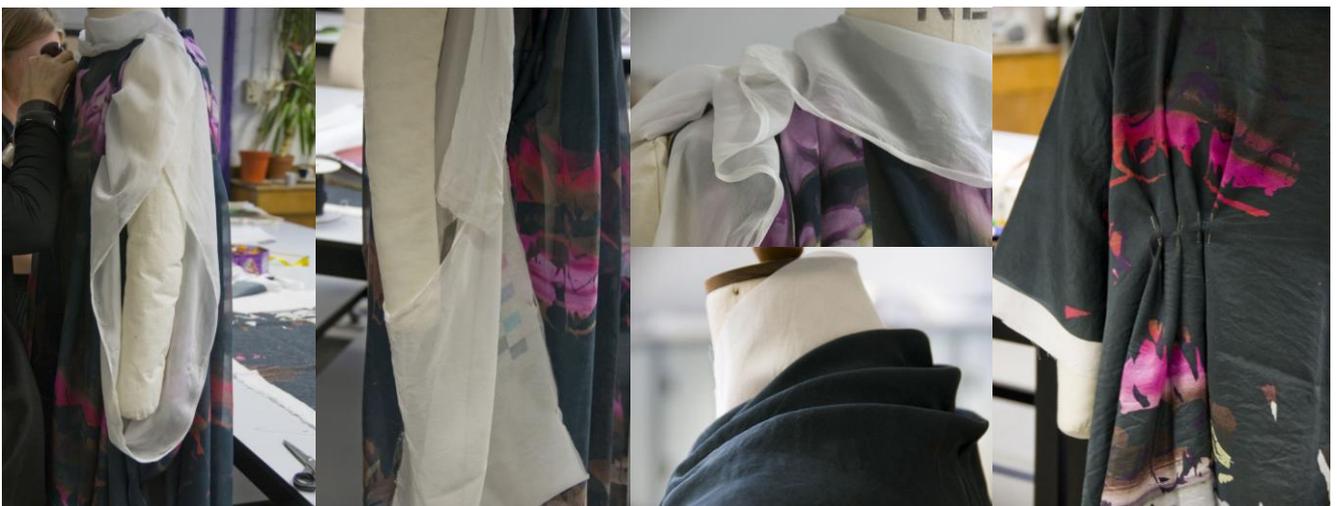


Figure 3: Blossom Dress – Details of fabric manipulation on different parts of the garment © Catherine Northall 2010.

The no waste approach to utilising all of the fabric meant that the white border on the edge of the print which would normally be removed as excess fabric was dealt with as part of the investigation. This unusual situation led the designers to adopt different techniques than usual by incorporating the white edge and selvedge as part of the design, framing areas of the garment in unusual ways.

## Water Course Dress

A contrasting approach was taken towards the Water Course organza length. The semi transparent quality of the fabric was considered by the designers, in particular how could a wearable 'garment' be created from 3 metres of cloth that also creatively explored the textile. The brief prevented additional materials, such as linings, to be used, so the solution was sought using fabric manipulation. Consequently, before modeling on the stand was attempted, a secondary process of smocking was applied to the printed length by the embroidery specialist, Tina Downes. The designer carefully applied the Princess Pleater, a traditional piece of textile technology, requiring dexterity and patience to thread and manually operate. Although more advanced methods of pleating exist, as stated earlier the workshop day was planned to be undertaken within the Fashion design studio, using traditional hand processes (drawing, modeling, draping, hand sewing) with a view to explore initial outcomes further using a wider variety of more advanced technologies in the future. The pleating process proved challenging to apply across the entire 146cm width of the fabric, so Downes was only able to partially ruche the length, resulting in around half of the width being smocked, leaving the remaining fabric flat. The effect on the cloth was stunning, emphasizing the fluid style of the flowing imagery and suggesting the Greek drapery of the chiton.



*Figure 4: Water Course Dress -Experimental draping and manipulation of printed and partially smocked length into a sculptural garment prototype © Catherine Northall 2010*

The partially pleated length was then sculpted on the stand by the fashion designers in close proximity to the form. The limitation of material necessitated an asymmetrical, one shoulder design, resulting in a shape that was redolent of but more innovative than the Fortuny Delphos and Pleats Please tunic dresses. The interrelationship between the surface and structural elements of the garment referenced the practice of Vionnet who used drapery to expertly sculpt the female body shape (Townsend 2004a). The resulting prototype demonstrated the potential to achieve a synthesis between the visual and tactile fluidity of fabric, form and texture.

As a result of Group 1s experimentation and the initial outcomes from Groups 2 and 3, further developmental No Waste (2D Lead), Movement (2D/3D) and Re-Use (3D Lead) workshops are planned. It

is envisaged that by using documentation from the first 'play' day the groups will be able to engage in deeper practice based explorative research.

## Reflections

Although sketching usually plays a significant role in the fashion design process, limited drawing took place on the 'play' day and instead the garment concepts were literally led by the aesthetic and tactile evaluation of the textiles, their draping properties and relationship with the form becoming the foundation for ideas and inspirations. This enabled the fashion designer and pattern cutter to respond more intuitively to the patterns and textures inherent in the fabrics, using them to inform structure as well as surface.

Cuts were made, the fabric was left to drape and this was reflected upon, discussed and then changes were made through considering the form in its full three dimensions. Working from a fashion designer's perspective by modeling on the stand provided the textile designers with valuable insights into how fabric quality and pattern performs when manipulated.

Throughout the activity differences between working directly with different weights and draping properties were examined and compared. The significance of fabric hand, sheen, transparency and opacity were made clearer to the textile designers, who often see their work as screen images or lengths. The utilization of 'white' non-printed cloth to frame areas and introduce contrasts to a printed garment was a potentially innovative 'no waste' approach that could be developed further.

Part of what was acknowledged on the day between the well established fashion and textile design staff is that they found it fascinating working directly with colleagues from different disciplines. This revealed unusual and surprising perspective towards the practices of turning a piece of cloth into a garment. In spite of the obvious links between fashion and textiles, most of the teaching staff's experience of working in industry or self employment had been undertaken in professional and intellectual isolation of their fashion or textile counterpart. Therefore they found the process of articulating and sharing their ideas and approaches with colleagues from another discipline acted to reveal their own particular methodology in a way that they had been previously unable to articulate.

While the integration of fashion and textiles practice is not a new phenomenon, and there are several examples of creative historical and contemporary 2D/3D design partnerships (Townsend 2008) it is significant to note that they *are* collaborative and that very few designers are able to perform both a fashion and textile role. The fact remains that despite the integration of design technologies, the approach to fashion and textiles in the industry remains fairly static, with a continued separation of the relationships between these creative activities. This research aims to illuminate and challenge this approach.

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