INTRODUCTION
This paper will examine the ‘added value’ a textile designer contributes to a broader range of disciplines, with particular reference to architecture and science. The notion of ‘added value’ is not only considered as a benefit for the two case studies in question, but also to the broadening of the textile designers practise.

Textile Designers are often considered the ‘dressing’ to the surface or the body as opposed to being an integral part of the development, often brought in towards the end of a process to embellish, and make finished a surface.

Two projects will be discussed in depth to illustrate the role of the textile designer fundamental in their development.

1. **TACTILITY FACTORY**: A spin out Company and collaboration with architect Ruth Morrow*, making hard surfaces soft, each skill being dissected and put back together again producing the frame work to make a tactile hard surface soft,

2. **CATALYTIC CLOTHING**: Working with Helen Storey* and extreme collaborations, the latest multi disciplinary project seeks to identify feasible solutions to the challenges of air borne pollutants in densely populated urban environments.

BACKGROUND
Having initially started a textile career in Industry as Co Founder of Belford prints (laterally RA Smart prints) Belford supplied a technical creative service intially to the fashion industry, translating and intrepretating textile designs for screen print production. This process involved specific skills from separation artits, colourists, printers, and dyers. The process of screen printing created scope for an innovative intrepretation of print design’s. This was an unaccountable necessity due to having to reduce many colours to a specicific number of screens (screen and set up costs were high) As a technically crafted printer close liason and collaboration with the client was imperative to achieve an interpretation sympatetic to the clients wishes whilst at the same time delivering to a budget. In many cases the client not being familiar with the technical processes was unable to articulate the final aesethetic, relying on the textile designer/printer to deliver. The digital explosion started at the end of the 1990’s somewhat removed this process of creative alchemy, it opened other doors and possibilities for the fashion designer but also closed a creative expression for a textile designer interested in the processes embedded withing the print industry.
Relocating back to Northern Ireland in 2005, a shift from Industry to Academic research, presented an opportunity to embed the creative process of textiles within the context of other disciplines.

**TACTILITY FACTORY (TF)**

Textiles in themselves are welcoming additions to any surface; fabrics are used to ‘soften’ both acoustically and aesthetically an interiors setting. But as referenced above this is as an addition after a building or interior is conceived and generally never as part of the initiation in the design.

From the beginning, the collaboration behind the Tactility Factory project aimed conceptually to *make hard things soft* and more specifically, “to mainstream tactility in the built environment”, by applying a textile approach to the design and manufacture of built environment materials and components. Tactility Factory focuses on combining concrete with textile technologies by designing innovative processes to deliver beautiful and sensorial engaging surfaces.

“It took three and a half years of research and development to identify and refine the correct constituent materials and technologies that can be used to combine textile and concrete manufacturing processes to create pre-cast concrete surfaces with an integrated and permanent textile surface. The textiles are specifically designed to include voids, meaning that surface patterning is created as much by the concrete as by the textiles. Interestingly, the resultant surfaces also convey a handcrafted, antique feel, despite being created using some digital technologies and processes. This ‘fossilisation of textiles is most notable achieved in the following two techniques

1. ‘linen concrete’: Varieties of linen weights and colours are used. Voids are created through which seeps the concrete, leaving an integrated and robust surface of concrete and linen. Linen is chosen since it is resistant to the alkalinity of concrete.
2. ‘stitched concrete’: A variety of technologies is used to allow stitched surfaces to remain on the surface. Yarns in a range of colours, weights etc can be used to create endless variations in pattern and design.
In its early stages, TF was driven by a singular collaboration between a textile designer and an architect. This remains at the core of its development but has progressed to include collaborations with pre-cast concrete specialists, mould makers, digital textile designers, weavers, embroiderers, graphic designers, marketing consultants, business advisors and patent attorneys.

Whilst many of those who contribute to the project do not come from identifiable ‘creative’ professions, they all contribute through their expertise and efforts to the application of creative ideas and to the resolution of operational problems. Finding the balance between personal motivations and direction of the company starts with an understanding of the strengths of each person.

Textile Designer: Trish Belford: Senior Research Fellow, University of Ulster

- Profound technical skills, a natural curiosity and a confidence to experiment within new and unfamiliar technologies.
  - An acute sensibility in creating rich tactile surfaces.
  - A fastidiousness about the fabrication of the aesthetic; trialing, testing and ultimately crafting and controlling each technical move to ensure quality outcomes.
  - An ability to lead in trend sensitive markets

Architect / academic brings: Ruth Morrow Professor of Architecture Queen’s University Belfast. Northern Ireland

- A strategic clarity to complex process
- A conviction in linking the conceptual, theoretical intention to the visceral lived experience.
- Skills in communicating across ‘languages’ and cultures i.e. from visual to verbal, from conceptual to operational, from artistic to engineered.

The intensity of learning around collaboration has been due in no small part to the hybrid nature of the project. Bringing concrete and textile cultures together in one project is a continuous challenge.”

Through using a combination of digital and analogue manufacturing processes TF is able to interweave the fabrication and design processes to the point where they exist in parallel; informed and formed by the other.

All results are considered through detail and with a sense of hand. In this the work of TF echoes Peter Rice’s (1994) insistence to “...make real the presence of the material in use in the building, so that people warm to them, want to touch them, feel a sense of the material itself and of the people who made and designed it.”

In the early days of TF, the outcomes were often viewed as art works. TF struggled with this perception and were exercised to understand why. In the end it seemed that people encountered the work simply as aesthetic one-off pieces that had no function other than to be decorative. As designers, even when trialling techniques, it appeared TF unwittingly imbued the work with an unconscious aesthetic. The perception of it being one-off was reinforced by the fact that the technology developed was not exact – so even when repeating the same

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piece, the resultant pieces differed. At the time, not aware of how interesting it was to achieve one-off pieces from what was essentially a mass production process – precast concrete. TF persistently rejects the word ‘art’, stressing instead the word ‘design’ to reinforce its pursuit of replicability and applicability.

Tactility Factory has three patented techniques and has recently been formed as spin out Company from the University of Ulster, Office of Innovation in this process the two entrepreneurial Directors are seeking partnerships with Precast construction and Textile Companies. The intention is that the workshop remains bespoke generating IP and the manufacturing is carried out either with partners or under licensing.

CATALYTIC CLOTHING

Belford as Co founder and Director of Belford Prints worked with Helen Storey on many collections for The Helen Storey fashion label. (nominated for Fashion designer of the year 1990/1991) As outlined during the introduction working collaboratively created the printed vision for the ‘dress’ and catwalk. Storey changed direction in 1997 founding with Caroline Coates The Helen Storey foundation4, created as a response to a project that required a brand new way of working. The Primitive Streak project was the first Sci/Art Award from the Wellcome Trust, a joint venture with sister biologist Dr Kate Storey. Storey created designs for a collection of 27 garments telling the story of the 10 key events in the first 1,000 hours following fertilisation. Storey once again called upon the skills of the Textile printer creator to interpret through process and experimentation some of the intricate embrogical development stages. This was an exciting project as the restrictions normally imposed by manufacturing, delivery and price were lifted with the perspective shifted towards innovative and understandable textile’s to illustrate a complex biology sequence.

In 2005 Belford now as Research Fellow was once again called upon by Storey to interpret through textile technical skills to deliver a series of dissolvable dresses. Storey worked collaboratively with Scientist Professor Tony Ryan, University of Sheffield creating debate and provocation around real solutions for a more sustainable world. The project titled ‘Wonderland’ brought together the worlds of art and science. By working together, Ryan and Storey have been able to use their different backgrounds to spark new ideas on the application of science and discover practical solutions to current ethical issues. In order to deliver this metaphoric message Belford was charged with making plastic beautiful that would sustain its beauty through out a 3-week exhibition where the dresses dissolved and disappeared.5

The most recent project is ‘CATALYTIC CLOTHING’

“Catalytic Clothing... the most challenging, globally relevant work I have ever attempted” 6

3 http://research.ulster.ac.uk/

4 http://www.helenstoreyfoundation.org/about.htm

5 http://www.helenstoreyfoundation.org/pro7.htm

6 Storey, Helen. 2008.
“Catalytic Clothing, was conceived in February 2008 and led by artist/designer Helen Storey collaborating with scientists/designers/artists, creating a series of artistic urban interventions, exploiting and creatively responding to an existing and proven technology (currently found in sunscreen, toothpaste, architectural materials)”

Utilising textiles, fashion, film, bespoke social media, transport and the built environment, Storey introduced the concept of clothing/textiles that can purify air, ultimately to improve public health, but engender public debate and interest. These artworks visualise, longer-term scientific development (University of Sheffield), endeavouring to provide advancement on this current technology, by providing cleaner air through the imburement of catalysts delivered through the laundry process.

This artistic programme, gradually revealed across three participating cities (London, Sheffield, Newcastle) will enable scientists to confront and respond to perceived/defined public critique to a forth coming technology through the artistic engagement with the above – representing, an exciting new model for public engagement with science.

Art and the development of the conceptual metaphor in the way of an air purifying dress will engage the public in the debate around pollution, in essence providing “live” research,

Storey collaborated with Belford to come up with the hybrid dress of textiles and concrete.

Why concrete and textiles?
Nano Ti02 is at the core of the science, acting as a photo catalytic that could have the potential to purify the air. As a self-cleaning product Ti02 is already used in the manufacture of concrete, therefore in the built environment the product is recognised as having productive advantages towards keeping surfaces clean. Storey and Ryan are asking the question? How can clothing technology be used to engage the public in the science behind the impact that pollution has on our health?

Funding awarded funding from the ESPRC with the University of Sheffield, has facilitated the first part of this research project by making the concrete dress. ‘Herself’

“This project is pushing at the boundaries of our skills and invented techniques by creating dresses, which are part concrete, part textile and fluid.”

Although aesthetic and purpose was key, we had to experiment with a number of techniques to apply TiO2. The application of Ti02 onto concrete surfaces for cleaning purposes is not a new concept, and is used globally in the construction industry, the application onto a textile substrate which crosses over to a hybrid textile, is however, and to the best of our knowledge, untried before.

The following techniques and challenges were undertaken:

- Experimental spray, using an open mesh fabric with a revised mix, using fine grains sand components and polymers to aid adhesion. By it’s nature concrete will peel of clothing and the technical solutions for the textile team were to:

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7 Storey, Helen. 2008

8http://www.epsrc.ac.uk
Maintain the properties of concrete, and therefore allow the possibility of Ti02 to maintain its function and help keep the garment self supported in open space.

- Not to loose the tactility of a fabric
- Allow the fabric to breath whilst holding its shape once concrete mix is applied

Subverting existing textile techniques for application the following processes were further investigated.

Screen Printing:
Traditional application of a mix (paste) by screen – printing. The challenge for this application is to penetrate a substance not normally squeezed through a screen mesh, whilst depositing enough of the cement mix evenly.

Spraying:
Talking the notion of applying paste to surfaces examination through plastering techniques using a render gun.

Dipping:
Taking influence from dipping techniques more in line with an indigo process, open structure fabrics (lace, crochet) were dipped in a vat until coated.

Flock:
Flocking is a traditional textile technique of applying cut fibres through an electrocially charged application
This process was of particular interest sparked by a comment from Professor Tony Ryan⁹ ‘flock would be a fantastic carrier as it’s surface area is increased by a factor of 500’ It is in this simple communication of diverse conversation topics that change can come about. This is at the ethos of collaborative thinking and exchange.

Due to the ‘peeling’ off of the flock fibres the flocking as a process was not successful but did lead to polyester backed viscose velvet being used. Polyester as it attracts Ti02 and velvet, as it is similar in nature to flock.

Two sets of tests were carried out:
- Deposit tests from the printed/spray samples, this indicated the most effective way to adhere the Ti02 to the fabric. This was carried out under an innovation voucher raised to the University of Ulster Bioimagering team lead by Professor Vyvyan Howard.
- Efficacy tests carried out by Crystal Global ¹⁰ that will determine what products are generated following degradation of selected pollutant species (to include NOx and VOC) by the various photo catalysts.

The creation of the dress took several months of trailing and testing under the critique of Professor Nicky Gregson, University of Sheffield, her key role and provocation was the message to the public and the perception of the project.

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The final outcome for the dress named ‘herself’ was a 3 week outside installation in Sheffield, located near a road constantly polluted with fumes. Lung visual references were used, darkened at the base and gradually becoming clean towards the lung area in the body, raising the public awareness of what can be achieved through and arts and science engagement. Further funding will be developed to take this research further and hopefully manifest itself in a ‘real’ product that can ultimately be added to a clothing wash cycle.

The process of making

Helen Storey & Trish Belford

As a by-product of investigation the results from Crystal global initially point towards cellulosic substrates as having improved efficacy over the existing concrete applications. This piece of knowledge could be significant in the developments of Tactility factory concrete surfaces and will be explored in more depth in the future.

CONCLUSION:

These two diverse subjects have engaged the textile designer in certain deliverable outcomes that without mutual trust, respect and collaboration would not have been possible.

Through using a combination of digital and analogue manufacturing processes the textile designer/maker is able to interweave the fabrication and design processes to the point where they exist in parallel; informed and formed by the other. While the final results may involve complex hybrid technologies it is determinedly insisted upon that the textiles must speak as textiles do – in an intimate and personal way to those who encounter them. No matter how digitally, scientifically or theoretical informed the project is the textiles and processes can do the talking at a humane level, leading the enquirer into the realms of art, science, engineering and construction with a gentle hand towards a larger vision of real life solutions.

The development of this joined up role for the textile designer brings many facets to other disciplines while enriching the textile experience locally and globally.