MEANING BEFORE MAKING

HOW DIGITAL TOOLS MIGHT ENABLE MATERIAL AND IMMATERIAL VALUE FOR SUSTAINABLE DESIGN

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Abstract

This paper explores the use of propositional design and digital tools for sustainable material and immaterial value creation in fashion design. Stuart Walker argues that within the current capitalist system, it is 'virtually impossible for the discipline of design to effectively and substantially address the interrelated issues of environmental responsibility, social obligation and personal meaning' (Walker, 2013). Propositional design objects are not design solutions but are concerned with 'challenging conventions, positing questions, and offering directions for reform.' Walker calls this 'non-commercial, academic, research-based designing' (Walker, 2013) propositional design. Alongside the increasing drive for more sustainable systems for fashion, digital tools have begun to change the way that fashion design is enacted. There has been a significant shift from the traditional physical craft skills of pattern cutting and sewing, to the use of software and digital spaces, used in tandem with the traditional fashion design studio environment. Software such as CLO3D allows for accurate patterns to be created digitally, emailed, and exported anywhere with an internet connection. Together with the changing context of the fashion industry and the growing desire to reduce waste, lower consumption, and redefine our relationship to clothes, these digital spaces provide new ways of thinking about and creating value.

Keywords: *Value, Sustainable design, Digital fashion, Propositional design, Technology*

INTRODUCTION

'Designers and manufacturers have no particularly profound knowledge of what the consumer values, and hence ever-changing trends, short product life spans and easy profit drive how clothes are currently designed.'(Niinimaki, 2010)

This practice-led research uses a propositional design approach and digital tools to explore sustainable value in fashion design. As Bourdieu articulated with his definition of cultural value, value is made up of multiple factors, some of which are tangible and some of which are 'understood'(Bourdieu, 1986). Clothing could be seen as having an outside (material) value and an inside (immaterial) value. Material value is that given by the context or society within which the garment circulates. Immaterial value I define here as the personal memories, and individual narrative attached to a garment. This practice is contextualised by current developments and debates around the drivers of sustainable fashion (Dabas & Whang, 2022; Goldstein & Foulkes-Arellano, 2024), technology, and the digitization of fashion (Blum, 2021; Holden, 2022; Alexander & Rutter, 2022) (Yang & Lee, 2023; Sarmakari, 2023; Schramme & Verboven, 2024) product longevity (Haines-Gadd et al., 2018; Khamisani, 2021) data-integrated workflows(Hensel et al., 2022) and emotional sustainable capacity and sustainable responsibility(Martinez et al., 2024).

As designers of clothing, we are used to working with material values: the fibre, the fabric,

the form and the finish. What is less considered by the fashion designer, is the immaterial value of the things we design, their personal meaning. Chapman defined 'emotional durability' and framed landfill as a design failure, where designers failed to create a bond between the customer and the product (Chapman, 2005). However, many designers are limited by the business models they are working within. A 2020 paper about design practices in sustainable minded clothing companies acknowledged: 'The global fashion industry requires a massive systematic transformation' (Niinimaki & Karell, 2020). However, whilst the authors recognised the desire to make sustainable choices, many designers lacked knowledge about best practices. When asked what 'sustainability' meant, product longevity, material selection and social responsibility all scored highly, but lifecycle thinking, and alternative business models all scored quite low. The authors acknowledged the lack of time that designers have to properly reflect on their decisions, so that material selection can 'dictate the discussion of sustainable design practices in many respects' because 'material is the embodiment of a product and is probably the easiest and most controlled (certified) way to integrate sustainability'. Importantly it seemed that 'sustainable design practices…were limited to incremental product focused approaches. Hence, they did not challenge the wider industry practices and the current fashion system' (Niinimäki and Karell, 2020). Niinimaki previously investigated sustainable attachment to clothing for longevity and attachment (Niinimaki, 2010; Niinimäki & Armstrong, 2013) identifying 'connection to memories' as the most important quality in keeping clothes for longer, above quality, style or even beauty. I argue, in the light of environmental and ethical concerns, that these immaterial values could be as important as material values and consider if they could be designed. Could we design meaning before making? By valuing both the material and immaterial aspects of the design process equally as sites of value, how would this change the design process? Academics have long studied the semantics of dress, the social and historical meaning of fashion, and more recently sustainable materials and digital fashion, however the role of the design process in the generation of meaning has not garnered as much attention. This research explores whether it is possible to use digital tools to design the material and immaterial value of a garment simultaneously. With digital technology's ability to dissolve boundaries between creative disciplines through shared software, and to collate, synthesise and organise large datasets, how could immaterial values be designed into a garment? I use a propositional design approach and digital tools to explore material and immaterial fields as distinct sites of value.

PROPOSITIONAL DESIGN

The practice was framed by Stuart Walker's propositional approach to product design research which he described as: '..a research methodology whose purpose is primarily exploratory and conceptual, the activity of designing should be regarded less as a *problem-solving activity* and more as a *question-asking activity*' (Walker, 2013).Walker argues that 'Perhaps the most important role for design today is to explore ways of re-uniting our material world with a world of meaning – with ethics, inner growth and spiritual wellbeing'(Walker, 2013). Like Critical Design and Speculative design, Propositional design removes commercial imperatives, allowing for broader question asking activities to occur. Propositional design objects are not design solutions but are '*questions in form*' concerned with 'challenging conventions, positing questions, and offering directions for reform.' Walker calls this 'non-commercial, academic, research-based designing' propositional design (Walker, 2013). As a design methodology, propositional design allows for a considered detangling of the 'wicked problem' (Churchman, 1967) of sustainability (Fig. 01).

As practice-based fundamental design research, propositional design involves three phases of theorizing, designing and reflecting. Propositional objects offer a different type of knowledge created *not through analysis but rather synthesis*, and 'provide a means of embodying issues of concern and reflecting on their implications'(Walker, 2013).

The risk with all outputs of design research is a focus on the aesthetic. The following practice represents an experimental formula for sustainable design, and importantly, not a product proposal. It does not represent a design solution; it is a conceptual fashion research experiment.

PRACTICE NARRATIVE

The first stage in propositional design research involves theorising: reading, writing and develop-

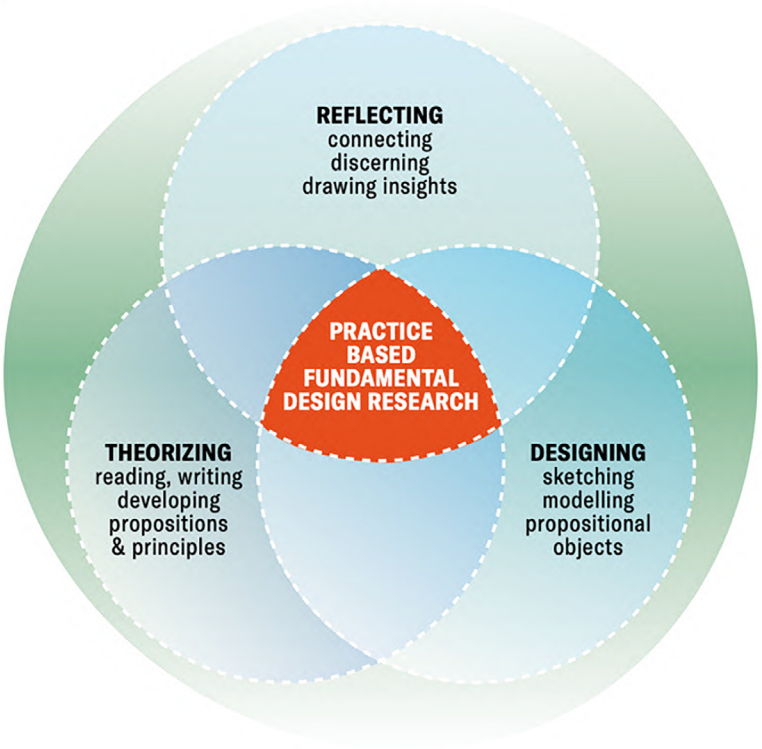

Fig. 01

ing propositions and principles. I began by investigating the relationship between people and objects, immaterial values and clothing to inform the design phase.

THEORISING

THINGS AS GATHERINGS AND 'ENTANGLED' VALUE

The archaeologist Ian Hodder described the relationship between people and objects as 'entangled'. Rather than focusing on objects as commodities, he used Heidegger's example of a jug to expand the meaning of an object to a 'thing' '...The jug takes what is poured into it, and then pours the liquid out. The water and wine come from a rock spring or from rain or from the grape growing in the earth. The pouring out can quench thirst for humans or be a libation to the gods… The jug, as thing, gathers together for a moment humans, gods, earth and sky.' (Hodder, 2012) This aspect of 'thingness' relates to sustainable design with its consideration of context (the environment), intergenerational design (people) and durability (long-term use). The notions of 'thingness' and 'entanglement' are helpful when positioning technology in relation to sustainability and value. If a designed artifact is a 'socio-material design thing' (Binder et al., 2011) digital technology – with its ability to gather, co-ordinate, facilitate collaboration, and re-distribute objects, surfaces, materials and data in time, space and any number of geographies – should allow not only materials and processes but also values to be designed in new ways.

CLOTHING AS MEMORY AND SOUVENIR

All objects retain or accrue immaterial or narrative value, and clothing is a potent example, as it is worn next to the body, and as such has the potential for greater intimacy with its owner. Embodied memory in inherited clothing was movingly described by Peter Stallybrass when he wore a jacket that had belonged to a deceased friend (Stallybrass, 1993). This sense of the past is perhaps most keenly felt in clothing, as it acts like a second skin, so close to the body that it takes on its form over time. 'Death activates clothing in peculiar ways, as if the garment takes over from the person...Yet it can only do so because, throughout our lifetimes, it accumulates the marks of lived experience. Our bodily imprint settles into the seams; the

DNA of our gestures moulds the garment into a ghostly negative of ourselves'(Evans, 2014). Both Stallybrass and Evans locate the intimacy, memory and narrative evoked by clothing in the evidence of use, but could this immaterial or narrative value be attached earlier, *prior to use*, adding further layers of meaning for a more 'emotionally durable' garment?

The sociologist Sherry Turkle wrote that 'everyday objects become part of our inner life'(Turkle, 2007). She described objects as bridges between our inner selves and our outer experiences, whilst Susan Stewart describes this connection as 'nostalgia' in relation to the souvenir. 'The souvenir speaks to a context of origin through a language of longing, for it is not an object arising out of need or use of value; it is an object arising out of the necessarily insatiable demands of nostalgia. The souvenir generates a narrative which reaches only "behind", spiralling in a continually inward movement rather than outward toward the future'(Stewart, 1992). Here, Stewart recognised nostalgia as a 'sort-of' need, and the souvenir as the narrative-generating object which satisfies it. As a form of social identifier, as a talisman, a memento, objects with a personal narrative attached to them are more likely to be kept and handed down to the next generation. If a souvenir authenticates the past, I propose that by designing using an individualised narrative, a souvenir might function not only as an aide-memoire but also *as a vehicle for connection to the self*.

NARRATIVES CREATE VALUE

As Stallybrass, Stewart and Turkle all acknowledge, the narratives we attach to objects create value. In 2009 Joshua Glenn and Rob Walker used eBay, the e-commerce website, to test their theory that stories create value for objects – even when the stories are not objectively 'true'. In their 'Significant Objects' experiment, they first bought a hundred insignificant objects at second-hand shops and flea-markets with an upper price limit of $1.25 per object. They then commissioned 100 writers to write a completely fictional short story about each of the objects. The objects were listed on eBay with the short story as the item description and auctioned. The results were definitive. The stories added significant value to the objects, with some selling for over $50 and even for over $100 each. Walker and Glenn realised that by adding a story, in some cases the value of the object had increased by more than 2,700% (Glenn & Walker, 2009). What this experiment demonstrated is that 'Stories are such a powerful driver of emotional value that their effect on any given object's subjective value can actually be measured objectively' (Glenn and Walker, 2012). If fictional stories add value to objects, then personal memories and connection to real events must create value, because they relate directly to individuals, families, friends, couples, social groups and communities. Just as technology enabled this experiment to take place, using a commonly used and well-known e-commerce site, technology here enables personalised data or memories to be *recorded, and harvested to actively create narrative value*.

DESIGNING

A CONCEPTUAL TRAVEL JACKET

To synthesise these ideas, I imagined a conceptual 'travel jacket' as a metaphor and hanger for the design thinking. This travel jacket would act as a physical diary, retracing travels and evoking memories, making the intangible tangible, by recording a highly personalised narrative. By weaving the narrative directly into the jacket's surface, the functionality of the garment would shift from the practical (pockets etc.) to the emotive, as a souvenir, aide-memoir and vessel for memory. The purpose of the practice being to explore how digital tools might combine with physical making, to allow meaning to be designed into a garment prior to manufacture or use.

The practice required concurrent digital and physical experimentation, with each area informing and influencing the other. The physical practice involved the weaving of cloth, and pattern cutting to create a garment form. This is what I defined as the *material value*. The digital experimentation was concerned with gathering and integrating travel data to influence the design of the garment, with an interactive system to engage the user. This is what I defined as *immaterial value*. Switching between the digital and the physical aspects of the research was not straightforward, but it was through this complex process or conversation that I progressed my thinking.

DESIGNING THE IMMATERIAL – GATHERING NARRATIVE VALUE

Following the theorising phase, my assertion was that the immaterial values of a 'travel jacket' might be designed using the metadata in a set of digital

photographs and linking them to a physical jacket as a propositional artefact.

To 'gather' immaterial value, I had initially collected and stored travel information on a prototype smartphone app, however, here the data was vulnerable. As more travel data was stored, the app began to drain the smartphone battery, as it was constantly 'on' and recording. All the data was lost when the operating system was upgraded by the user. At this stage, I made the decision to use digital photographs to provide the travel data. Smartphones are used daily, and digital photographs have replaced physical photo albums as memories that we carry with us. Using the metadata attached to digital photographs was practical, as no additional energy was needed, and the telephone battery would not be affected. To convert the metadata into information usable for the travel jacket, a website was created with a developer, to test the principle of uploading, storing and converting the photographs. Separating the tasks of 'gathering data' on the smartphone and 'using data' to create value on a website, was important in the digital development. The additional advantage of a website over an app, was the greater capacity for storytelling, as more elements could be integrated to establish a narrative. I planned to use the time and location metadata in the photographs, and connect their aesthetic, by extracting the colour at the same time as the geographical information. The website could be coded to 'see' each photograph as a grid, which would then be overlaid over each successive image, taking the colour from the same points on the grid each time. As the user moved through the photographs, the extracted colours could be applied to the surface pattern of the jacket.

THE PHYSICAL JACKET

A jacket was designed, a paper pattern made and toiled in calico to test the fit in the studio. Once correct, the paper pattern was digitised, enabling it to be exported to design and textile software. In the time since this practice was undertaken, (and post Covid 19 when studios were locked down and international travel prohibited), digital pattern cutting in software such as CLO3D is becoming industry standard practice. CLO3D allows garment patterns to be made and easily moved between digital software and the formation of 3D rendered digital garments.

TRANSFORMING DATA - FROM IMAGE TO STRIPE

Once digitised, the surface of the travel jacket was designed to accentuate its form and employ the travel dataset. Whilst working on the digital jacquard looms, I noticed how the 'Pointcarre' software iteratively reduced image complexity to simple colours and threads for weaving. I was drawn to the idea of taking something complex and difficult to capture (such as a landscape) and simplifying it to essential components or blocks. Influenced by the artist Sol Lewitt and his series of black and white isometric drawings (Lewitt, 1982), I developed a simple stripe design on the jacket surface, by repeatedly offsetting the pattern piece shapes, which could then be 'filled' with the colours from the photographs. This allowed the aesthetic of the jacket to be directly affected by the aesthetic of the images. I made a test of the offset stripes design using the colours from a photograph taken during a trip to the Swedish countryside, importing those colours into the stripes on the jacket. Using the colours from a set of images, memories of a place could be abstracted and linked to the jacket. A user would be involved in the making process by choosing what to photograph, which images they uploaded, and which version of the jacket they selected to make (Fig. 02).

JACKET SAMPLING

Several woven toiles were made on a digital jacquard loom. To check the stripe positions and scale before weaving, a printed toile was also made, to test the colour positioning. The jacket panels were printed onto sublimation paper, cut out, positioned on a test fabric and placed in the heat press, where the colour was transferred onto the fabric. A black and white version tested the line position, a full colour version tested the colour placement. This, together with the jacquard weave tests, provided the factory with a full colour prototype and all the information to set up the looms to weave the jacket panels. The lay plan of the pattern pieces was adapted to the width of the sample looms at the factory. A lay plan is the arrangement of pattern pieces which determine how much fabric is needed. Keeping the pieces as close together as possible reduces the amount of fabric required and the amount of wasted cloth. The wider the cloth, the less length required; the narrower the width, the more length required to fit in the pattern pieces. Once the lay plan was arranged to fit the loom width, the pieces could

Fig. 02

be woven, cut out and sewn together to create the finished jacket. The jacket was woven at Stephen Walters Ltd (Stephen Walters & Sons, 2024) based in Sudbury, UK. The company was founded in 1720, and specialises in Jacquard weaving, which embeds a surface pattern into the cloth through the weave structure.

WEBSITE PROTOTYPING

Prototyping the website involved creating pages to explain the connection between the map (Google Maps was used) and the jacket. A homepage was developed showing a spinning globe, which 'flattened' into a map on a subsequent page and rudimentary keys were positioned to allow the user to 'login/out', 'add images', 'show images' and 'start journey'.

Upon pressing the 'start journey' button, an animated line moved from one picture location to another, showing the locations of a year of photographs taken from my smartphone. Clicking on 'show images' opened a large grid showing hundreds of photographs taken in a year.

The final page showed a flat layout of the jacket pattern pieces with the colours on the jacket changing as the user moved through the photographs using the arrows.

Advantages:

- The metadata and images were safely stored on a website and would not be lost.
- The story of the interactive jacket could be told more effectively.
- The smartphone battery was no longer drained by the app gathering the data.
- The coding for the colour extraction had been shown to work.

Challenges:

- The storytelling behind the jacket needed further development, as the connection between the photographs and the jacket remained visually unclear.
- The aesthetics of the site were not yet conducive to a fashion context.

FINAL WEBSITE DEVELOPMENT

In the final website design, a different structure was employed to create more cohesion in the narrative and an aesthetic more suited to luxury fashion. The pages and buttons were removed, and a dark background map was used as the backdrop to highlight the colours in the jacket. Google Maps remained the basis of the backdrop, but the labelling and details of the locations were removed and a slider representing a year from left to right (January to December) was added. As the slider moved, thumbnail pictures appeared over the locations in which they were taken. To better tell the story of the colour extraction onto the jacket, a 3D model of the jacket was produced.

THE 3D JACKET MODEL

A 3D jacket model was made using the software 'Marvelous Designer', which enabled the digital pattern to be digitally 'sewn together'. The software is used in CGI (computer generated imagery) and computer games to create realistic clothing (Marvellous Designer, 2024). The digital pattern was imported and converted into a 3D model of the jacket, complete with surface pattern. The 3D jacket was placed over the global map twice (one model showing the back and one model the front) and each model made to slowly rotate so that the front and back of the jacket were displayed simultaneously.

Transferring the photograph colours onto the 3D jacket was done by 'texture mapping'; a method of applying patterns or surfaces onto 3D models used in animation. This process is used

to transfer a 2D image onto a 3D form to make a computer-generated model more realistic. The developer wrote code, which harvested the colours from the photographs as before, and projected them onto the moving 3D models and the flat pattern layout simultaneously. This made more sense visually, when the 2D pattern was seen alongside the 3D jacket that the pieces combine to create.

The website acted as a proof of principle (POP) model demonstrating how the personalised data encoded in digital photographs could be used in an interactive experience. The jacket was transformed into a poetic and symbolic object, gathering traces of a journey and weaving them into a narrative-laden surface. The function of the jacket shifted from physical needs to psychological needs, evoking human connection, memory and emotion. The 'retrace jacket' connected to a time and place through an image and the memories associated with it (Fig. 03; Fig. 04).

Fig. 03

REFLECTION

REDESIGNING RELATIONSHIPS

This practice argues for digitally restored connections between the designer, product and user, restoring relationships broken in mass production. Hugh Dubberly asserts that design is being re-framed or 'de-materialised' and describes a shift from transactions to relationships. People, smart devices, software applications and services gather together in product-service ecologies he suggests and that 'these gatherings need to be designed' (Dubberly, 2017) The retrace jacket is an example of a 'gathering', a conceptual product-service ecology, involving mobile technology, digital imagery, animation, interactive web design, digital jacquard weaving and garment construction, moving across disciplines to pull disparate elements into configuration around central research questions.

The research used a propositional design approach to determine if a physical and emotive journey could be designed into a garment, designing 'things' not commodities. It employed the surface of a garment as a container to store and evoke memories. The resulting propositional artefacts (website and jacket) suggest an interactive process to build narrative and meaning into clothing. Drawing on memories as a driver for design, the function of the jacket becomes symbolic, and entirely subjective. Using data, fabric was woven with colours linked to a time and place that already had value attributed to them. Photographs served as time capsules, activated and re-materialised in a garment. This surface can be worn, and further narratives added through use, creating a deeper, layered sense of connection and meaning. Stored images 'map' a year as a travel journal, recorder of time, and personalised data source. Taken together, the website and jacket imagine a design process which places meaning at its centre.

The propositional artefacts identified several questions for further research:

- Are immaterial values as important as material values for sustainable fashion design, and how might these be designed into garments?
- How could the fashion design process be reconfigured to generate greater meaning for users?
- Could the metadata housed in digital photographs become a personalised resource for use in fashion products as souvenirs of rarefied experiences?

Fig. 04

- Do interactive systems encourage product durability and brand loyalty in a fashion context?
- Could mobile devices act as data collecting tools, to personalise fashion?
- Could digital processes enable future fashion systems to discard 'stock' and be wholly made-to-order?

MEANING BEFORE MAKING

This research challenges the current paradigm, where meaning is given to objects artificially through advertising and then after manufacture, through use. Tilley's 'meaning through use' (Tilley, 2001) fuses with designed-in meaning, consolidating value long-term. As we move into a post-industrial society 'an immaterial culture is emerging' (Moles, 1995) and in this digital culture, data is as valuable as oil (The Economist, 2017). We protect our data with online security, passwords and firewalls, are warned about the dangers of data theft, and the prospect of corporations using our data against us. For designers, personalised data represents a vast untapped resource, to create sustainable connections between ourselves and our possessions. Using data to create *meaning before making*, in the form of narrative and emotive value, could be key to product durability. Souvenirs and heirlooms evoke events, places and people of significance to us. The images, sounds and movies we gather on our mobile telephones have value to us as a diary, and a means of connection with others. Images previously housed in a photo album might be reframed as a personal, rarified resource which, when combined with sustainable production could redefine fashion. Making less and linking the physical and the digital spheres through designed interaction, is one route towards a sustainable source of value for fashion. Designing clothing that means something to us, is worth further investigation.

Propositional design, as an academic tool, could be adapted to fashion design as a means of creating space to open up future research avenues. The impact of this methodology would be to reimagine and visualise a transformed process encouraging product attachment, reducing waste, lowering emissions, advancing digital workflows, sustainable processes and new business models. By merging personalised data with digital tools and storytelling, this project demonstrates how a re-imagined system might discourage overcon-

sumption, overproduction and resource use by making meaning or immaterial value a driver of sustainable value in fashion.

CAPTIONS

[Fig. 01] Practice-based fundamental design research (Walker, 2013).

[Fig. 02] A stripe pattern was created to accentuate the pattern shapes, and the colours taken from a photograph were positioned into the stripes of the jacket.

[Fig. 03] The jacket in 3D, and being woven on the Jacquard looms at Stephen Walters & Sons.

[Fig. 04] A Propositional Artefact – The Retrace Travel Jacket.

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