

# escapology

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Transcending Boundaries of Flat Patternmaking and Design Practice

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## ABSTRACT

This practice-based project explores creative three-dimensional design and patternmaking processes applied to minimal cut and sew garments through an investigation between cloth and body. The question guiding the research was 'Can a different approach to garment shape development, which relates to past practice, be translated and refined to relate to mass production practices?'

An answer to the research question was formed by re-instating the designer-maker at the centre of the development process in order to reconnect the cloth with the body, as well as the cloth with the making practice. This resulted in a system of patternmaking, which is referred to as 'The Cube Method'. This is a method of draping geometric shapes guided by cloth movement through and around the bodily form, in order to explore negative space, silhouette and shape.

The final stages of the research involved the translation of the three-dimensional designs into a commercial platform for replication through the use of a computer-aided pattern drafting system. This stage of the research revealed reproducible pattern and garment shapes suitable for sustainable mass production, while also protecting the intellectual property of the design.

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## ATTESTATION OF AUTHORSHIP

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

A handwritten signature in black ink, appearing to read 'SL West', with a stylized flourish at the end.

Stephanie Lee West

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Stephanie West, May 21, 2016

# CHAPTER ONE: INTRODUCTION

## RATIONALE

This research began through questioning my own practice in garment creation and the desire to investigate new, and in some cases old, possibilities within this area of creative garment cutting. Using three-dimensional artisan design processes that is drape, was it possible to develop innovative pattern and garment shapes that can be translated through to a commercial process?

Having been trained and employed to use two-dimensional design and pattern drafting processes to create a three-dimensional garment outcome, I was motivated to explore the possibility of disrupting my usual two-dimensional method by exploring new design approaches to making and thinking three-dimensionally. Through this study I intended to discover new ways of working within my own practice by combining these two-dimensional and three-dimensional processes.

## RESEARCH OBJECTIVE

The relationship between body and cloth were explored through draping fabric directly onto a tailors form with the aim of creating organic designs. Consideration of form, movement, fall/drape, shadow, silhouette, geometric shapes and negative space became intrinsic design decisions mingling with tacit knowledge.

An emphasis was placed on the process of garment creation, rather than the end product. When explored in this way, the relationship between body and cloth links designer and pattern-drafter through the use of three-dimensional practices.

The research objective examined design through draping to combat waste and labour intensive processes found in commercial production. Those patterns were then tested for reproduction by inputting into industry computer-aided pattern drafting software

StyleCAD, with the purpose of developing commercially viable shapes. This was done through practice-based research with an 80 per cent practice and 20 per cent writing weighting.

## CONTRIBUTION

By positioning the project within the context of the New Zealand fashion industry, it identifies the production environment in which these artefacts would sit. This will have the benefit of minimal seaming and cutting, thereby reducing the labour cost per garment, allowing for small to medium sized operations to be performed onshore. Minimal seaming has the potential to keep production onshore through reducing labour intensive construction, thereby combating the higher wage economy (Enting, 2011).

This research also resulted in unique garment shape outcomes, providing different creations available to the wearer. With this added potential for future transformation and versatility within the wardrobe, this model could reduce post-production waste created (Townsend & Mills, 2013).

An unexpected contribution was the creation of a system of design and patternmaking that preserves the intellectual property of the design; it would be difficult to reproduce a garment without its pattern and construction information.

# CHAPTER TWO: CONTEXTUAL FRAMEWORKS

This chapter is broken into two main sections: the research, literature and observations found that contextualise this project; and the developments made through the practice-led research. Part one introduces patternmaking, including conventional methods along with the alternative methods and development that provided the current context within which this project sits.

Part two introduces the conceptual underpinnings that this project sits on. The ethereal qualities of cloth, along with its relationship to the body and geometric shapes, builds the scene for the following chapter in which the project's 'Cube Method' of patternmaking is discussed.

## 2.1 PART ONE: PATTERNMAKING

As Dorothy Burnham (1973) identifies, there are two main types of garments produced historically: cuts based on animal skins and those produced from loom lengths of cloth. Traditionally, apparel held high value as one-off pieces, which were custom-made and then passed down. Only through mechanisation as a result of the Industrial Revolution did clothing become mass produced and accessible.

Since then the fashion industry has evolved into its current state. Couture and bespoke one-off garments still exist, but attainable fashion is mostly seen through the models of the chain store fast fashion, which is mass produced mainly in third world countries (Black, 2008; Rissanen, 2013).

The modern commercial production cycle can be broken down into two main categories: product design and development, and production and manufacture (Burke, 2011). Non-commercial

production of garments (generally bespoke and artisan) follows a similar process on a smaller scale, but may move back and forth in the cycle depending on requirements.

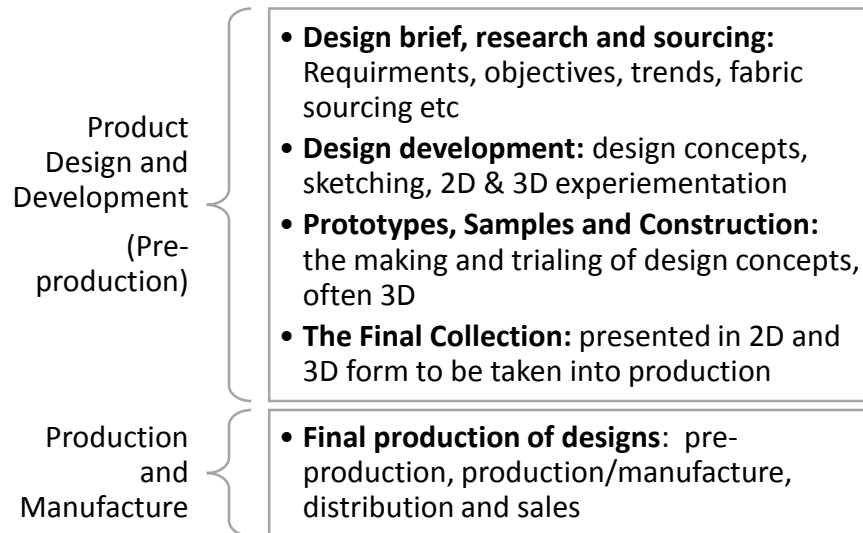


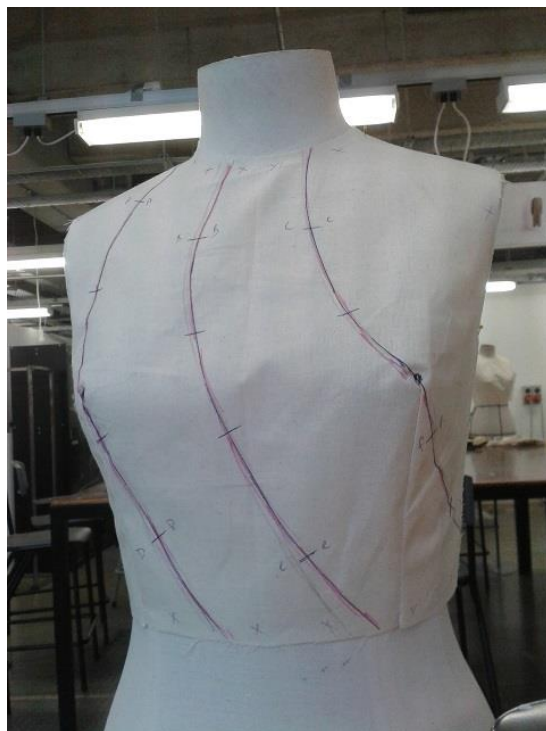
FIGURE 1: WEST, S. (2016). COMMERCIAL PRODUCTION STRUCTURE; BASED ON BURKE (2011).

Garment patterns are seen within both categories; through pre-production they are drafted to form the three-dimensional design, then used to cut final garments in production. Patternmaking<sup>1</sup> is a highly skilled technique that connects design to production through an interpretive design sensibility and knowledge of production practice. In pre-production the patternmaker scrutinises the design using a combination of two or three dimensional methods until accurate for final production (Cooklin, 1991).

Therefore the tools and visual communication used in patternmaking become vital for a successful outcome. Pattern markings and symbols need to be comprehensible and readable from drafter to cutter to machinist to ensure no mistakes are made through each phase of production. Such markings and symbols can

<sup>1</sup> Also referred to as pattern-drafting and pattern-cutting. For the purpose of this project I will refer to pre-production patterning as patternmaking, and production use of patterns as pattern-cutting.

include the use of notches<sup>2</sup>, grainlines, drill-holes and other important pattern information are needed for cutting and construction (Joseph-Armstrong, 2006, p. 4).



*Figure 2: West, S. (2014). Images showing both 2D and 3D use of notches and pattern tools.*

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<sup>2</sup> Notches are markings made to a pattern and transferred to cut pieces, normally through a snip, that communicate the essential balance, connections and pattern information needed through phases of pattern drafting and construction (Joseph-Armstrong, 2006).



A Specification Sheet with flat front and back working (technical) drawings of the design along with fabric, pattern and garment details is commonly bundled with a pattern through production to aid in successful communication outcomes (Burke, 2011). This becomes important within the project as research develops; documentation of the garment creation process is needed for future communication.

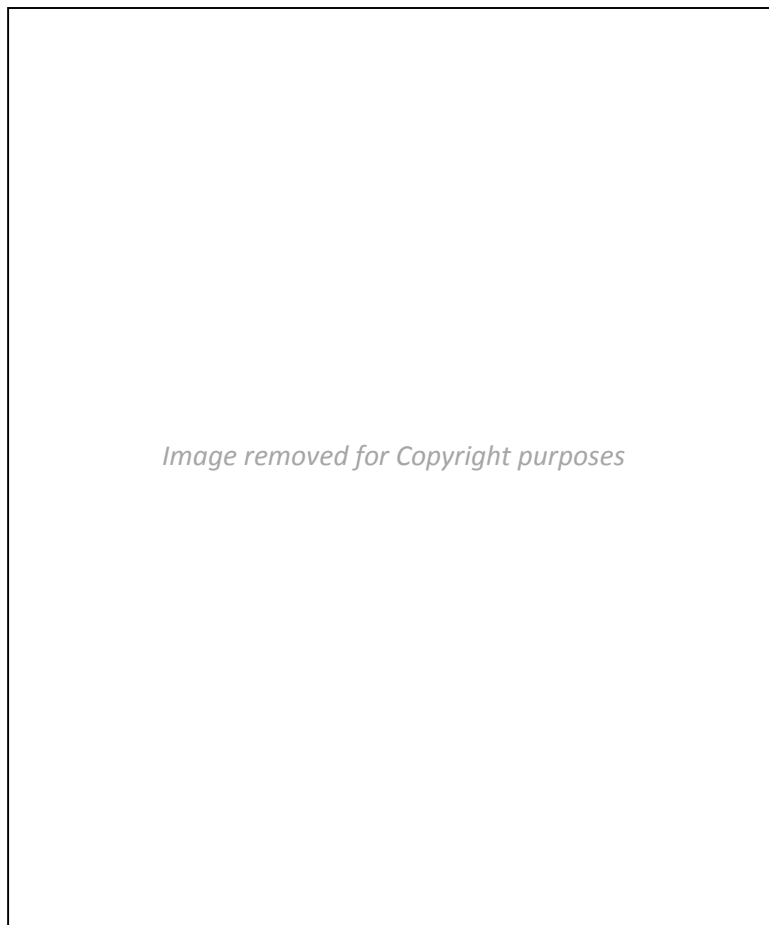


FIGURE 3: BURKE, S. (2011). DESIGN STYLE SHEET/SPECIFICATION SHEET EXAMPLE

### 2.1.1 CONVENTIONAL PATTERN SYSTEMS

#### THREE-DIMENSIONAL PATTERN CUTTING

Wrapping is an ancient method of garment creation; as seen in the Roman Empire era and still exists in the traditional Indian Sari.

Apparel was influenced by loom lengths and widths, and traditions of wrapping, climate, resources and cultural practices (Burnham, 1973; Crill, Wearden, & Wilson, 2002).

Draping<sup>3</sup> is a technique that uses the dress form to generate designs and patterns through methods of pinning, wrapping and covering it with fabric, echoing the ancient system of wrapping. Traditionally draping has been an artisanal three-dimensional method for its ease in creating design and pattern simultaneously (Burke, 2011; Durburg, 2011). If the garment is to be reproduced, the three-dimensionally draped pattern is converted into a two-dimensional flat pattern through deconstruction to document the pattern's shape, markings and symbols.

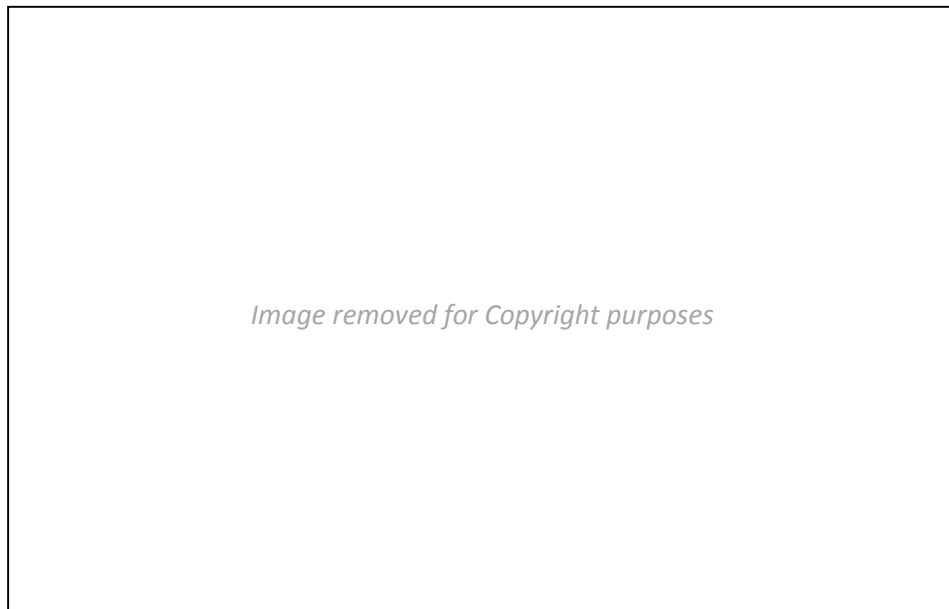


FIGURE 4: DUBURG, (2011). IMAGE SHOWING CALICO PATTERN BEING DEVELOPED BY DRAPING DIRECTLY ON TAILORS FORM.

Working directly on the form allows both the designer and patternmaker to check the proportions, lines and fit while designing and creating (Burke, 2011), pinning fabric to the form until seaming occurs. Furthermore, draping is useful within design development for its ability to create complex silhouettes that a two-dimensional method may not permit.

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<sup>3</sup> Also referred to by its French term Moulage.

Madeleine Vionnet, an early 20<sup>th</sup> century French couturier, has been influential with her draping and complex bias<sup>4</sup> cut processes that enhance the properties and integrity of fabric (Buxburn, 1999). Vionnet's legacy to fashion has been widely acclaimed and analysed as a pioneer influential in reinventing the use of drape by exploring fabric potential on a half-scale form and then reproducing the design in full scale (Buxburn, 1999; Kirke, 1991). This is a method of working that was embraced through this project to explore the design and pattern possibilities with minor fabric use.

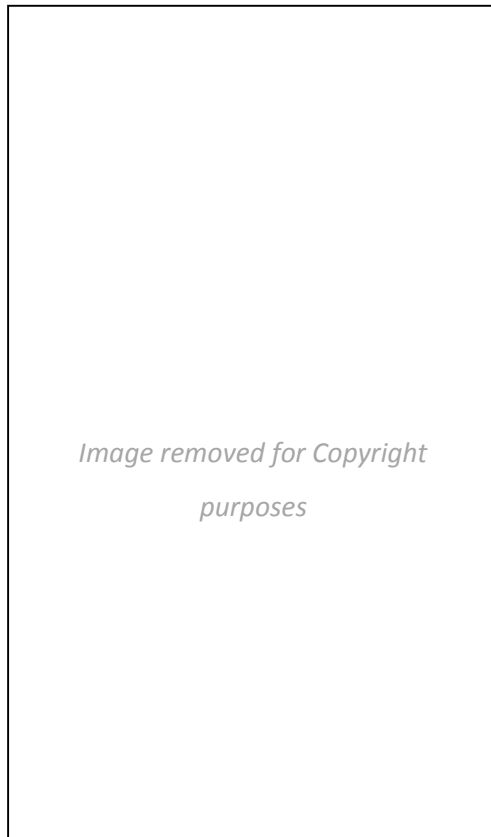


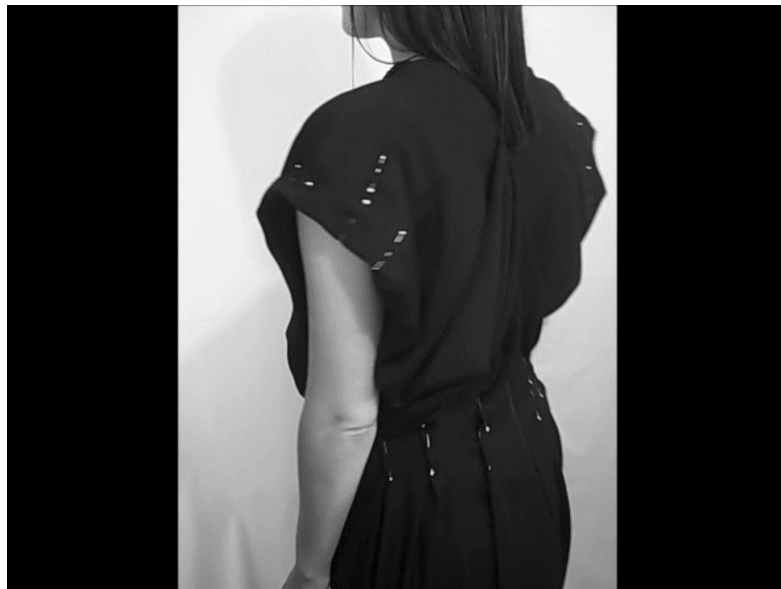
FIGURE 5: KIRKE (1991). HALF SCALE DRAPING BEING PERFORMED BY MADELEINE VIONNET.

When creating a garment directly on the form/figure, there is a risk of the artefact becoming too close to the figure, so that it hugs the shape of the form, as this is what the eye and hand are focusing on. This was discovered during previous work I explored in my post

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<sup>4</sup> Bias cut: use of the straight grain of fabric in a diagonal method. Turning the pattern on a 45 degree angle to the fabrics Salvage edge.

graduate research, so that the artefact outcomes mirror the figure shape. That is, the space between cloth and body decreases and garment shapes become predictable again. Therefore the project's cube / geometrics method on the body enabled interesting artefact outcomes, with increased negative space to be explored.



*FIGURE 6:* WEST, S. (2014). 'MORE THAN A PIECE OF CLOTH' PGDIP EXHIBITION PIECE, DRAPED ON THE FIGURE.

## TWO-DIMENSIONAL PATTERNMAKING

Two-dimensional patternmaking refers to the making of garments through flat techniques. This method in various forms can be traced back to when animal hides and cloth were cut and sewn to create garments (Burnham, 1973; Croom, 2000; Tilke, 1956).

Through industrial growth in the 1800s, flat pattern matrix systems were developed by tailors and dressmakers, exploring different pattern drafting structures. The practice of pattern drafting was likened to that of science and art, and as such tailors heavily criticized and critiqued each other's methods, with the dominant systems surviving (Aldrich, 2002).

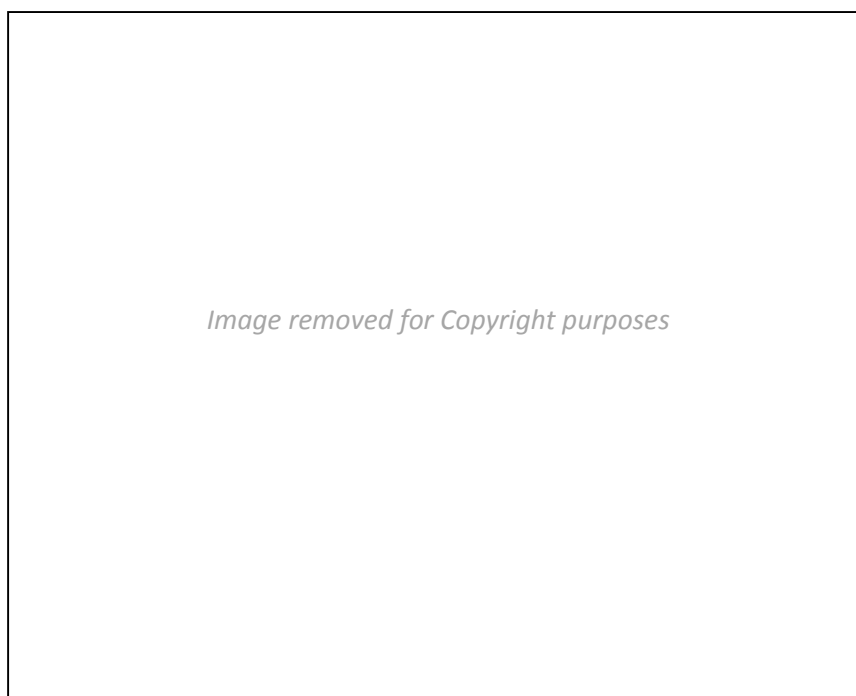


FIGURE 7: ALDRICH, W. (2002). HISTORICAL TAILORS DIAGRAM FOR DRAFTING OF A WOMAN'S JACKET.

Blocks<sup>5</sup> are the foundation for flat pattern development.

Measurements are taken from the form or body to create a basic Block pattern. These can be drafted either by following two-

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<sup>5</sup> A foundational template that is used to start the drafting process, which can be either individual or standard size. The Block can benefit the patternmaker by reducing the time spent on size development, with basic pattern documentation readily available for the speed of pattern development. Usually half a front or back with no seam allowances.

dimensional mathematical formulas and instructions (Aldrich, 2008), or from three-dimensional draping methods (Durburg, 2011). Block manipulation techniques of slashing and pivoting in paper or calico are used to arrive at the desired design.

During pattern development, three-dimensional modelling may occur to inform flat patterns before progression of *toile*<sup>6</sup>. Several samples with pattern alterations may be produced before completion of final flat pattern and toile.

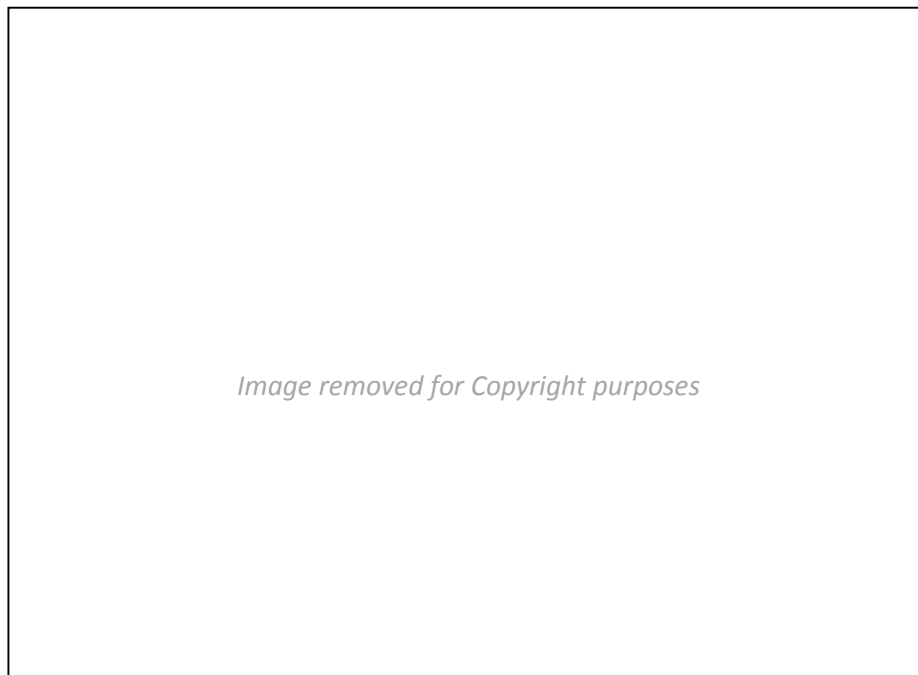


FIGURE 8: ALDRICH, W. (2002). TAILORED JACKET BLOCK DRAFT, FOLLOWING MATRIX FORMULAS, DIAGRAM AND INSTRUCTION TO RESULT IN A BLOCK.

## GARMENT CREATION TECHNOLOGIES

Throughout history, fashion manufacture and design has had a close relationship with science, mathematics and technological advancements (Page, 2013). The use of computer-generated patterns has increased with technological advancements in computer-aided design and manufacture (CAD/CAM) technologies.

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<sup>6</sup> *Toile*: French term used within industry referring to the sample, prototype garment.

This has subsequently replaced manual techniques, where possible, for speed, cost effectiveness and production globalisation. StyleCAD is the CAD system that was used within this project.

Computer-aided pattern software follows the foundations and principles of two-dimensional patternmaking. However, the potential of three-dimensional designing and drafting that mimic working on the form is continuously improving (Beazley & Bond, 2003).

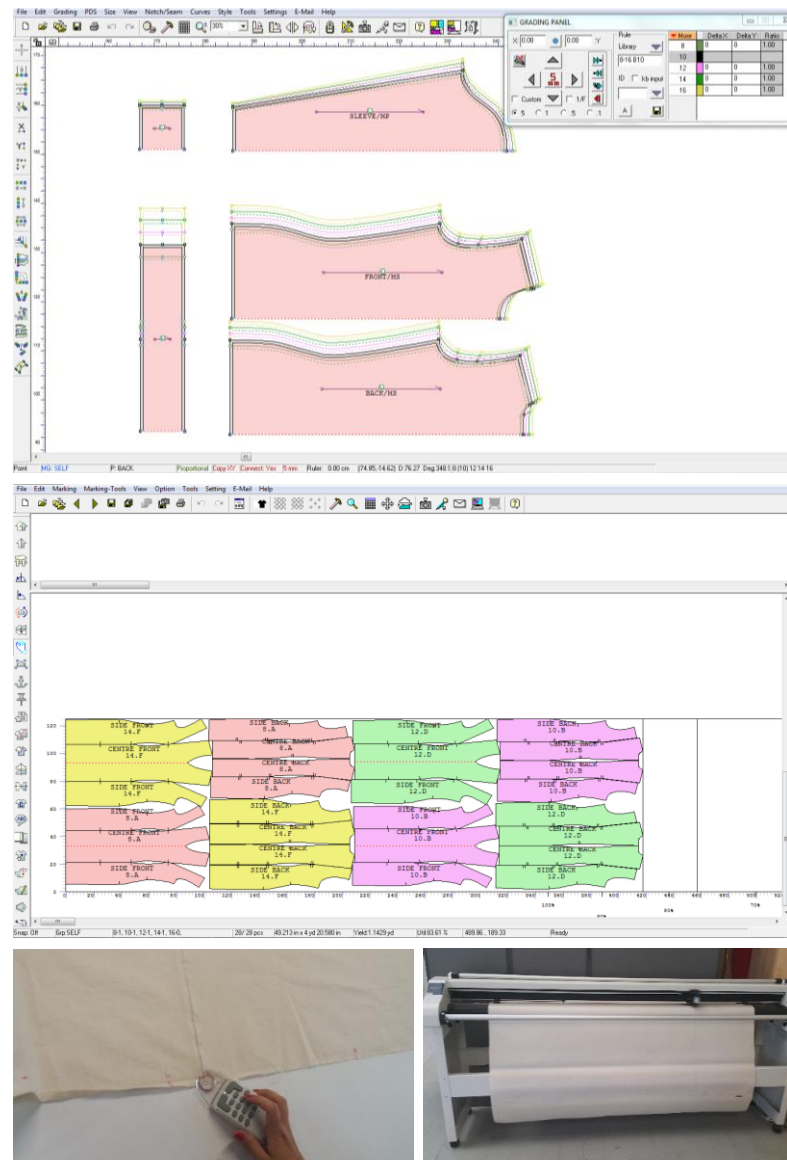


FIGURE 9: WEST, S. (2016). STYLECAD SOFTWARE SHOWING PATTERN AND MARKER CREATION. HARDWARE SHOWING DIGITIZING OF CALICO TOILE TO GENERATE PATTERN, THEN PLOTTING OF PATTERN TO BE USED FOR CUTTING.

### 2.1.2 ALTERNATIVE PATTERN SYSTEMS

Alternative patternmaking approaches have been explored and published openly over recent years. A shift in the sharing culture of knowledge within this arena has been observed, with practitioners making available publications at no cost, for example 'Free Cutting' by Julian Roberts. Workshops, seminars and online courses are promoted for sharing practice developments. The fashion industry is bound by economic and time constraints that restrict investment into developing enhanced methods of working (Rissanen, 2013), so it is beneficial that such research by practitioners is readily available (Swann, 2002).

Patternmaker Rickard Lindqvist (2013) identifies, in his doctorate, two categories that these progressive drafting systems can be defined as: the first follows draping techniques through block manipulations such as those of Nakamichi's '*Pattern Magic*' series and Shingo Sato's '*Transformational Reconstruction*'. The other category looks at ways of experimenting with pattern pieces or shapes to result in new or unexpected outcomes, such as in the work developed by Julian Roberts in '*Subtraction cutting*', and Timo Rissanen and Holly McQuillan in '*Zero Waste cutting*'.

### ZERO WASTE METHODS

Zero waste cutting methods are being explored in response to unsustainable production practices currently found within the fashion industry. The effects of fast fashion on the consumer, as discussed by The Fashion Praxis Collective (2014), highlights the mass-consumption behaviours that have developed, leading to a negative impact on the environment as a result. In response to a growing awareness around the need for the industry to become sustainable, production techniques, methods and processes are being explored internationally through research and development (Hethorn & Ulasewicz, 2008; Levitzke, 2012; Minney, 2011).



Internationally recognised pioneers and researchers in the zero-waste<sup>7</sup> garment cutting practices of Timo Rissanen and Holly McQuillan are an example of this. They explore related research aims connected with reducing and eliminating pre-consumer waste within garment production.

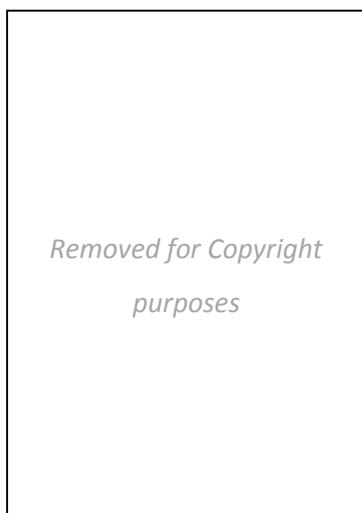


FIGURE 10: BURNHAM, D. (1972).  
MAN'S SHIRT, SOUTH AMERICA CIRCA.  
1930.



FIGURE 11: RISSANEN, T. (2013). AN  
EXAMPLE OF TIMO RISSANEN'S ZERO  
WASTE METHOD; DENIM COAT 1999.

The foundational ideas of zero-waste methods are echoed in the historical origins of pattern cutting and garment creation. As Burnham (1973) identifies, historically there was no waste produced from the cutting of garments, unlike common fashion practices today, as they valued the cost and labour that went into hand-weaving the cloth, so it was all utilised in some way within the garment.

As Rissanen (2013) identifies in his doctorate research, conventional design and patternmaking practice wastes approximately 15 per cent of fabric through left-over cuttings. Ultimately the responsibility lies with design (Swann, 2002) and manufacture to improve this percentage; however time is money and businesses generally are not in a position to explore this (Rissanen, 2013).

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<sup>7</sup> Zero-waste fashion is a term that has been coined in relation to this 'cut waste', a by-product of the commercial fashion industry.

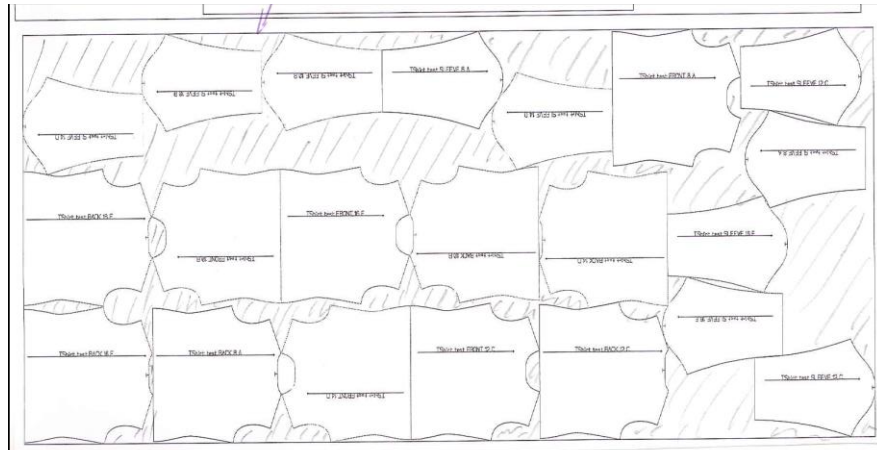


FIGURE 12: WEST, S. (2014). STYLECAD MINI-MAKER SHOWING WHAT A FULL SCALE MARKER WOULD BE FOR A BASIC TEE-SHIRT. FABRIC EFFICIENCY RATE IS SHOWN AND MARKER CAN BE REWORKED AT THIS STAGE IF EFFICIENCY<sup>8</sup> PERCENTAGE ISN'T HIGH ENOUGH.

The sustainability consideration to minimise pre-consumer waste was instrumental through the design considerations of this project, using the methods and evidence explored by Rissanen (2013) and McQuillan (2013) as a basis to justify minimal waste practices within the project's patternmaking developmental method.

## ONE-PIECE PATTERNS

'*The Transformative Cut*' by Rickard Lindqvist devises a method of drafting where garments are constructed using a 'points on the body' system. He challenges the traditional tailoring matrix methods, saying that the body needs be the focus and context of design and pattern methods once again (Lindqvist, 2013). This reinforces the theories that designer Issey Miyake promotes about the foundation of garment creation, that the body is key. This philosophy was central to this project and the approach that was taken through the investigations.

"Issey Miyake has taught us that essential truth: that clothing is made of a single piece of cloth enveloping a moving body"

(Chandes, Sato & Meier, 1999, p. 32).

<sup>8</sup> Efficiency percentage is the amount of wasted fabric that has been calculated in a marker.

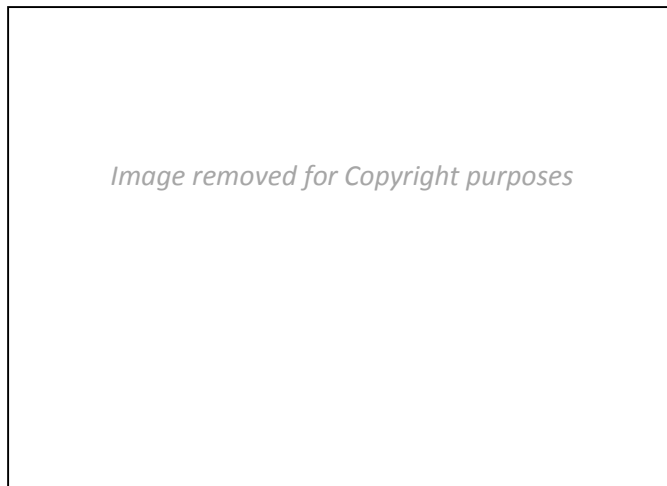


FIGURE 13: BURNHAM, D. (1973). INFANTS SHIRT CIRCA 1812. ILLUSTRATING A ONE-PIECE PATTERN THAT SHOWS THE HISTORICAL LINK TO GARMENT CUTTERS EMPLOYING A SIMILAR TECHNIQUE.

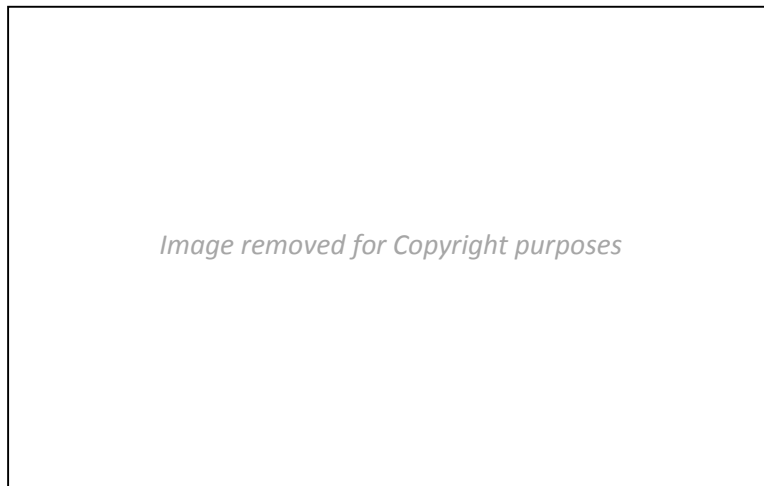


FIGURE 14: LINDQVIST, R. (2013). 'A QUALITATIVE LOGIC' - 6.11 APPLIED EXAMPLE, SHIRT.

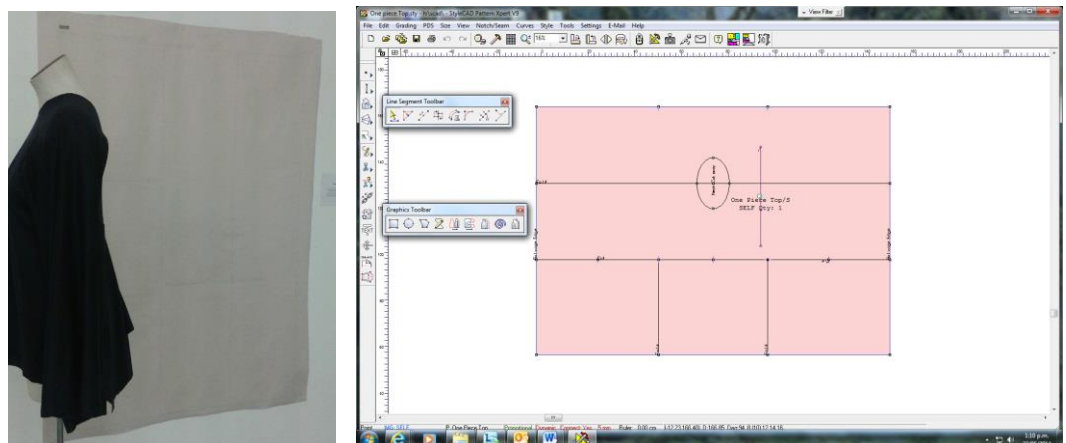


FIGURE 15: WEST, S. (2014). 'MORE THAN A PIECE OF CLOTH' ONE-PIECE GARMENT EXPLORED ON STYLECAD, CREATED AND DISPLAYED AS PART OF POST GRADUATE STUDY.

## SUBTRACTION CUTTING

International practitioner Julian Roberts developed 'Subtraction Cutting'. Roberts describes his system of patternmaking as "Designing with Patterns, rather than creating patterns for designs" (McQuillan, 2012). This systems explores the possibilities of the body passing through cloth to form unexpected garment designs, and uses the positive and negative spaces created with fabric surfaces to develop garment formations. While this project also worked with positive and negative spaces, it instead explored this concept through the view of cloth on body, rather than the spaces developed through cloth on cloth.



*Image removed for Copyright purposes*

FIGURE 16: MCQUILLAN, H. (2012). IMAGE OF JULIAN ROBERTS PATTERN AND GARMENT CREATED USING SUBTRACTION CUTTING.

### 3D BLOCK MANIPULATIONS

Shingo Sato has raised his profile internationally for being a practitioner-researcher that explores the basic principles of working three-dimensionally on the stand to simultaneously design and pattern draft a garment, using a combination of paper and fabric processes. Sato uses an effective notch system, developed to recognise complex pattern pieces through construction with ease (Sato, 2011).



*FIGURE 17: WEST, S. (2014). SAMPLES PRODUCED AT SHINGO SATO WORKSHOP APRIL 2014 AUT SHAPESHIFTING CONFERENCE. EXAMPLE OF WORKING WITH BOTH CALICO AND PAPER TO PRODUCE OUTCOMES BASED ON BLOCK FOUNDATION. THE IMPORTANCE OF NOTCHES TO ACHIEVE ACCURATE OUTCOME.*

## 2.2 PART TWO: CONCEPTUAL UNDERPINNINGS

Along with patternmaking practices, this project drew on conceptual understandings of cloth and body, sensory and spatial awareness, and geometrics on the body, to inform a path of inquiry.

### 2.2.1 THE BODY

It is important to understand the anatomy of the body for any patternmaker; how it moves, responds and reacts is key. To understand how garments respond to the movements, stresses and form of the body is vital for successful garment creation (Berry & Hennes, 2008; Teng, 2003).

The commercial fashion world has become somewhat estranged from this concept of the three-dimensional body. Fast-fashion is forgetting the objective of making clothes to enhance the beauty of the body (the wearer). Garment designs are often depicted merely from a front or back view drawing on a specification sheet passed to production. The body has been forgotten with the rise of fast and cheap fashion, and also can be within fashion education and literature (Lindqvist, 2013).

By combining both two-dimensional and three-dimensional patternmaking methods, there is an opportunity to keep the body central when designing. This is because three-dimensional drafting reminds the designer-maker of the three-sixty view of a body through interaction. This project explored the collaboration of 2D and 3D methods, which keep the body as the central focus.

### 2.2.2 PHENOMENOLOGY

We have relearned to feel our body; we have found underneath the objective and detached knowledge of the body that other knowledge which we have of it in virtue of its always being with us and of the fact that we are our

body. In the same way we shall need to reawaken our experience of the world as it appears to us in so far as we are in the world through our body. (Merleau-Ponty, 1962, p. 239)

The relationship between the cloth and body can be explored through the sensory perception of cloth on body, which can be captured through phenomenology (Featherstone, 2010). Merleau-Ponty (1962) describes phenomenology as the 'study of essence', which best describes the characteristics of sensory awareness of the cloth in contact with the body. These are important aspects for a designer-maker to consider.

The need to refocus practices back to the body and how it interacts with the cloth can be viewed and analysed through the lived experience and observation of cloth on the body (Dunseath, 1998). This describes the movement of cloth when interacting with the human form, the space that both these occupy and how this aids or inhibits interaction.

"As cloth in clothing is the most tactile of surfaces, always in contact with skin and body it carries the contradictory meanings of being an external surface turned outward towards the gaze of the viewer, while remaining forever proximate" (Pajackowska, 2005, p. 242).

The texture, surface and space that the body senses when cloth and body collide, touch, skim or distort, have been described as the negative space within this project. Silhouette and shadow also brings inspiration and interest to the cloth, informing design ideas:

### 2.2.3 SHAPES AND SPACES

Architecture and fashion have similarities when viewed from the perspective of the body; they are both designed to cocoon or wrap whilst dealing with volume, spatial relations, structure, void and materiality (Leach, 2012; Quinn, 2003). Through this comparison we can draw inspiration and conceptual understanding of shapes and

spaces with the context being the body: "...both rely heavily upon human proportions, mathematics and geometry to create the protective layers in which we cocoon ourselves" (Quinn, 2003, P.6).

The space between two points; that is, the span between cloth and body, movement, drape, fabric folds and relationship to the object touched were fundamental to this project. The folds, form, and materiality of the cloth when draping upon the body or manipulated by the body, created shapes, silhouettes and shadows, negative voids and positive forms (Deleuze, 1993).

## GEOMETRICS

Fabric is produced through the weaving of a geometric shape; a rectangle, therefore it is an easy transition to keep shapes in linear form: "As woven textiles designated spatial boundaries, they also introduced the idea that the owners of the textiles had the right to occupy the spaces they demarcated" (Quinn, 2003, p. 3). A recurring theme of inspiration for designers is the use of geometric shapes within designing and pattern drafting, creating wearable structures (Bugg, 2009; Leach 2012; Quinn, 2003):

"Cloth, woven on a loom, incarnates the most troubling of conceptual paradoxes. It is a grid, a matrix of intersecting verticals and horizontals, as systematic as graph paper, and yet it is soft, curved and can drape itself into the three-dimensional fold." (Pajackowska, 2005, p. 233)

These structures have the potential to explore spatial relations with cloth and body through void development, created as a side effect of geometrics on the body.



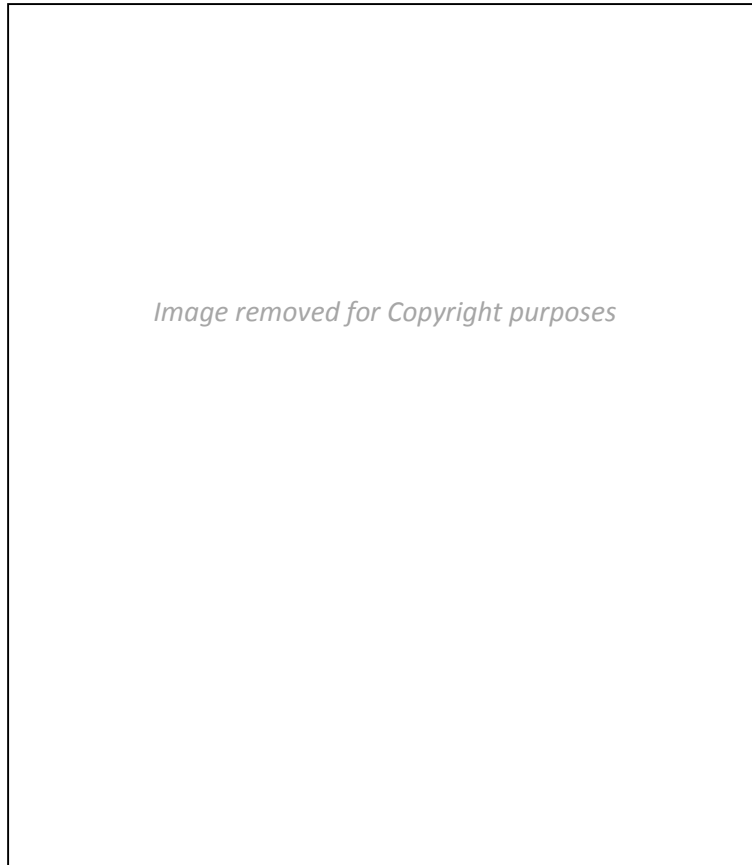


FIGURE 18: LANCIA TREND VISIONS. (2012). 'THE CUBE' BY MINA LUNDGREN A SERIES OF WORK PRODUCED EXPLORING THE CUBE ON THE BODY.

#### 2.2.4 THE CUBE & THE BODY

A space is 'enclosed' between the sides of a cube as we are enclosed between the walls of our room. In order to be able to conceive the cube, we take up a position in space, now on its surface, now in it, now outside it, and from that moment we see it in perspective. (Merleau-Ponty, 1962, p. 236-237)

As reflective practice occurred through the project, a cube and cuboid shape evolved, holding the criterion central to the research methodology; that of minimal cutting and sewing artefacts. Three-dimensionality is discussed through the shape, creating negative space around the body as well as within itself.

As Merleau-Ponty (1962) describes, the way in which the body views a three-dimensional cube is through the experience at any given angle the body is viewing the cube; it is hard from any singular angle to see the cube in its full entirety. The views are broken down into squares through inspection, therefore the appearance of the cube becomes the pre-conceived idea of what one knows it to be, once further angles and views are explored. The experience of the body in motion exploring the cube is the perception from which it is viewed, and thus created.

In the same way, the relationship between the moving body inside the projects cube / cuboid garments and the three-dimensional shape occurs through the unity of the objects and the connections made. In flat pre-constructed two-dimensional form the cuboid is easily understood and read as the simple display of two rectangles. However once the constructed three-dimensional cuboid is placed on the body, it is observed that the form is no longer recognisable and complexity is added to the once-simple shape. The body is not a geometric shape, so when encased by one, negative and positive spaces are created between the opposing surfaces of object and subject.

Once the body is unified with the cuboid, it is difficult to distinguish and detach the body from the formation of the artefact; that is, how the body combined with the artefact influences the folds and falls of the fabric. Only through a pre-conceived understanding of the body shape and location can we trace the outline of the human form in places where it disappears into the spatial spheres of the artefact. As both fabric, shape and body interact with each other, they inform the shape and formation of the garment. Only through repositioning the artefact's openings and starting rectangles laid out to construct the cuboid will the form alter again, without the presence of the body.

### 2.2.5 THE SPACE BETWEEN

The conversion of the flat two-dimensional cloth surface to a three-dimensional folded surface when enveloping the bodily form creates crevasses; that is, apex and convex, mountains and valleys. Interior folds exist in the contradictory negative and positive space to the exterior folds (Deleuze, 1993; Pajackowska, 2005); the spatial territory formed in the interior of the artefact between cloth and body become the negative space, such as in that of artist Karen LaMont's technique of glass casting.

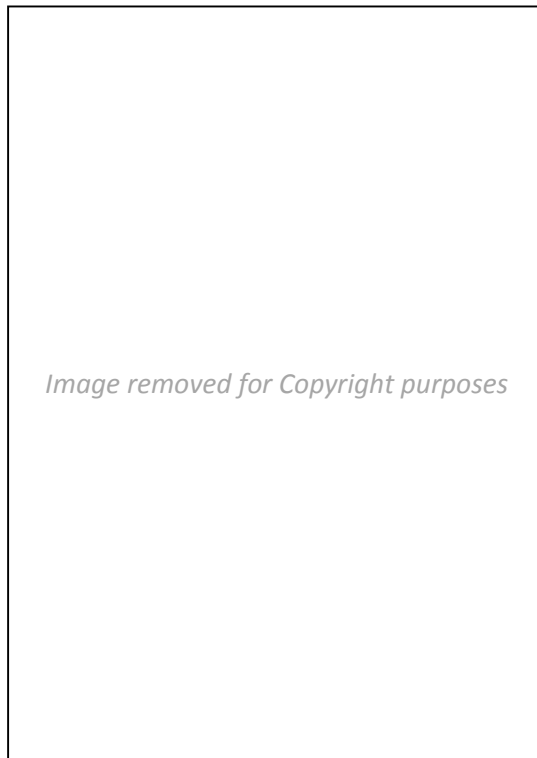


FIGURE 19: LAMONT, K. (2005). KAREN LAMONT, SEMI-RECLINING DRESS, IMPRESSION WITH DRAPERY, CAST GLASS.

The inside and the outside, the seen and the unseen regions of the fabric when folded on itself or when the structure holds its shape away from the body form, helps to create the realised artefact. The space between the cloth draped and the body on which it sits informs a negative space; intimate but curious as to its boundaries and explorations. It is sensual and sensory in the expressions of this space.

## CHAPTER THREE: METHODOLOGY AND PRACTICE

This chapter begins by introducing the methodologies and methods used within this project. The chapter is then arranged into a sequence of phases that make up the project framework of practice, concluding with the project outcomes.

### 3.1 ACTION RESEARCH

This project undertook practice-led research (Gray & Malins, 2004) in order to explore and answer the research question: ‘can the method of draping achieve less waste and labour intensive processes found in commercial production?’ Using the practice of action research (Crouch & Pearce, 2012), different methods of investigation were employed to explore the potential of the research objectives.

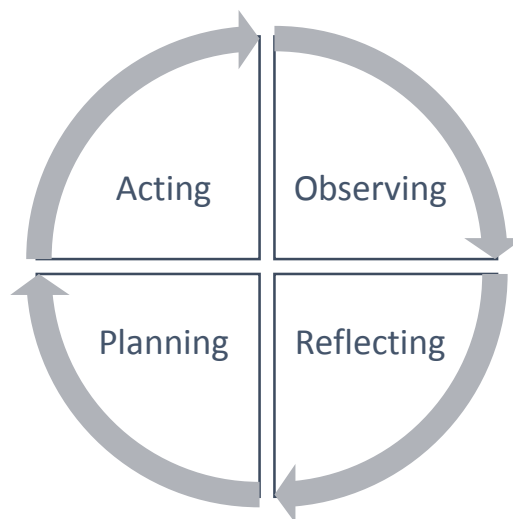


FIGURE 20: WEST, S. (2016). DIAGRAM SHOWING ACTION RESEARCH CYCLE (CROUCH & PEARCE, 2012).

Methods included the use of photography to document and capture the essence of cloth on body. Three-dimensional idea sketching was used, through the use of a half-scale tailor’s form. Then prototyping

/ toiling of ideas was carried out through the use of a full-scale tailor's form, followed by mark-making and digitising of patterns to translate into a commercial platform. This was supported by diagrammatic sketching and workbooks.

Reflective practice-in-action took place throughout the process to successfully record and analysis potential outcomes. As Crouch and Pearce (2012) identify, the best course of research for practitioners to explore and problem solve a design question that is driving their research is through action research methodology.

### 3.2 PROJECT FRAMEWORK OF PRACTICE

This research explored the potential of patternmaking as a means to problem-solving the research question. As Cross (2006) and Swann (2002) illustrate, the act of designing is problem-solving, using solution-focused strategies. An optimistic approach was undertaken, hoping to solve the issue at hand, rather than the scientific approach of researching to find the problem:

"Exploratory making can play a role in both analysis and synthesis, supporting the process of generating new designs, whilst also affording reflection and reasoning about their properties" (Harrison, Earl, & Eckert, 2015).

The project hypothesis was that, through the three-dimensional garment creation process of draping, it becomes possible to achieve minimal waste, and cut and sew artefacts to be translated into a commercial setting. Through employing research-in-action with this objective in mind, the resultant patternmaking system 'Cube Method' was moulded.

The following phases of the project developed as the research-in-action occurred.

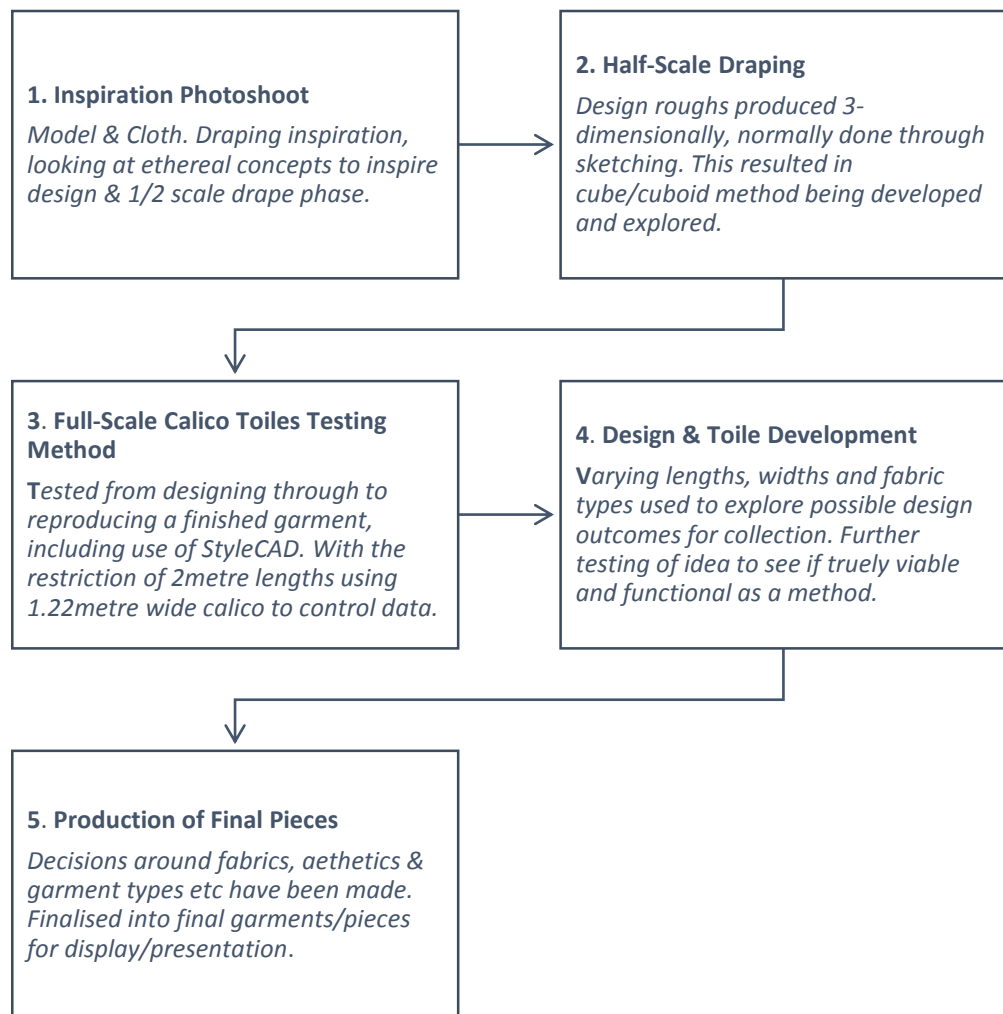


FIGURE 21: WEST, S. (2016). DIAGRAM OUTLINING THE PHASES OF THE PROJECT.

### 3.2.1 PHASE ONE: CLOTH & BODY PHOTOSHOOT

The sensory perception of cloth on body, captured through the use of phenomenology (Featherstone, 2010), creates an awareness of one element when touching the other. This became a significant component in the project that was continuously observed whenever cloth and body interacted. Consideration of both cloth and body movement is needed when draping directly on the form to successfully achieve artefact formations. The project's design

concept reflected on this movement, along with the space that they both occupy and how this aided or inhibited interaction together.

The materiality and ethereal aspect of cloth when draped upon the body was documented through a photoshoot that galvanised the design process. Photographs and moving image captured how the cloth intermingled with the body, revealing spaces and shapes generated through this relationship.

A model along with different cloth lengths of varying weights, composition and transparency was encouraged in a photo studio to freely interact with the cloth. The movement, entrapment and interaction connected her with the fabrics, allowing for organic interactions to be recorded.



*FIGURE 22: WEST, S. (2015). MOVEMENT AND CLOTH. SERIES OF PHOTOGRAPHS EXPLORING THE RELATIONSHIP BETWEEN CLOTH AND BODY. THESE IMAGES LOOKING AT MOVEMENT OF THE CLOTH. FROM MODEL & CLOTH INSPIRATION PHOTOSHOOT SERIES.*



*FIGURE 23: WEST, S. (2015). NEGATIVE SPACE. SERIES OF PHOTOGRAPHS EXPLORING AND DOCUMENTING THE SPACE BETWEEN CLOTH AND BODY, REFERRED TO WITHIN PROJECT AS NEGATIVE SPACE. FROM MODEL & CLOTH INSPIRATION PHOTOSHOOT SERIES.*



*FIGURE 24: WEST, S. (2015). FORM, SHAPE & SILHOUETTE. SERIES OF PHOTOGRAPHS EXPLORING FABRIC FOLDS, SHADOWS, CONTRAST AND SILHOUETTE WHEN INTERACTING WITH THE BODY. FROM MODEL & CLOTH INSPIRATION PHOTOSHOOT SERIES.*



The photographs captured the essence of the cloth when engaged in a three-dimensional relationship with the human form. They became a valuable starting point within the project and remained central by providing visual stimulation in the making phase, assisting observations of cloth / body interaction and movement.

### 3.2.2 PHASE TWO: HALF-SCALE DRAPING

The fluidity and materiality of cloth when hanging from the body in the photographs influenced the design and exploration decisions throughout phase two. The observation of cloth folding as one side was pulled, tucked or pinned to the other captured the imagination, with the resultant garment possibilities.



FIGURE 25: WEST, S. (2015). WORKBOOK SHOWING PHOTOSHOOT INSPIRATION.

The initial focus of this project was to discover interesting and unique pattern shapes through the use of three-dimensional methods. But it was found that having a particular garment in mind to achieve on the stand resulted in predictable garment shapes. Through reflective practice (Swann, 2002) it was obvious that the first half scale trial was disappointing; that is, it became a predictable 'coat' garment.



FIGURE 26: WEST, S. (2015). HALF-SCALE 'PREDICTABLE' COAT GARMENT.

To escape the confinements and predictability of traditional garment outcomes, the focus moved to geometric outlines within a two-dimensional width of the fabric, creating the freedom to develop unexpected shapes and outcomes. Also, the restriction of trying to create a particular garment outcome was dropped, creating unconventionality through experimentation.

This shift in focus became a turning point within the project. Using rectangles and squares cut from a flat surface, which were pinned and draped onto the form, resulted in the 'Cube Method' being created.

By adopting a holistic three-dimensional approach, this model intertwines three areas of garment creation: the design, pattern and construction as one process. This consequently eliminated hierarchical practices, as each garment remains organic in its formation. The pattern becomes the last article produced and the garment sewn becomes the first artefact created.



FIGURE 27: WEST, S. (2015). INITIAL HALF-SCALE SAMPLES EXPLORING 3D SKETCHING OF IDEAS.

The designer-maker approach was explored for its potential to disrupt the predominantly two-dimensional methods of conventional fashion design. This amplified the use of three-dimensional practices to achieve outcomes, overlapping the pattern-drafter and designer roles.

As draping, folding and hanging cloth directly on a human form provided intimacy in garment creation, this challenged the norm of segregated titles seen within the fashion industry (McQuillan, 2012). Simultaneous design and patternmaking also increased the opportunity for unique garments to be formed, and increased sustainable practice through the formation of minimal-waste pieces.

## SKETCHING WITH FABRIC

The conventional method of designing<sup>9</sup> did not fit this project model, as three-dimensionality was the focus. However it became apparent that a link was missing when analysing the decision making criteria. Reflection, discussion and research was needed to solve the research question (Cross, 2006). The deliberate act of removing two-dimensional drawing from the initial design stage was not something foreseen as having an impact on design ability and decision making. Nevertheless, using only three-dimensional methods to form decisions without sketching was both foreign and challenging. As Makela et al. (2007) discuss, that freehand sketching is an important part of design concept exploration and thought processing.

Continuous decision making when draping can be arduous, therefore being able to sketch is helpful to sort, reflect and eliminate ideas (Makela, 2007). To drape directly onto the full-scale tailor's form with no clear idea of design intention became gruelling. The energy and focus needed to design in this way resulted in an unenthusiastic response to the process.

Identifying the gap within this phase as the lack of two-dimensional drawing led to the rediscovery of the half-scale tailor's form as a three-dimensional method of design exploration. The assurance of using smaller portions of fabric resulted in a design environment that was both freeing and conducive to creativity.

Vionnet's patternmaking on the half-scale dress form yielded original garment shapes (Buxburn, 1999), thus inspiring its use to be adopted within this project when the design process gap was identified. This allowed experimentation to take place through a reduction in the fabric cost and wastefulness.

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<sup>9</sup> Using visual research as inspiration, a series of ideas (roughs) are sketched, with some 3D trialling of details until a design is critiqued and finalised to send into the patternmaking phase to produce a sample of the design (Burke, 2011). This method is taught to students as it is often used in conjunction with flat pattern making processes.

Ross and Wensveen's (2010) study assisted to further develop the design criteria for this project. These were: 1) Aesthetic – the overall look to be achieved; 2) Sustainability and ethical dimensions; 3) Three-dimensional form; and 4) User / wearer. Identification of the project phases also helped to create parameters around the project territory and intended outcomes required to successfully trial this patternmaking method. Phases of the project were now able to be better identified.

## CUBE VARIATIONS

The resulting 'Cube Method' was explored through a series of artefact experimentations. A formal sense of inquiry developed to discover the potential of alternative fabric widths and lengths, combined with minimal cutting and sewing, to create unique and interesting garment shapes using this method. With the fabric laid out on the table 'what if' questions began to generate 'what if another cut in the length of fabric were made?', and 'what would happen to the cuboid result if this was done?'

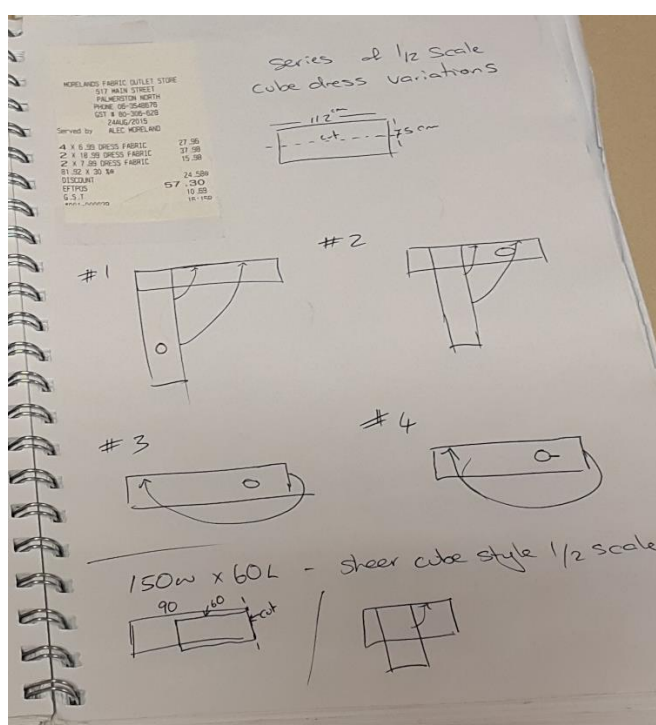


FIGURE 28: WEST, S. (2015). WORKBOOK SHOWING DEVELOPMENT OF CUBE GARMENTS.



FIGURE 29: WEST, S. (2015). HALF-SCALE CUBE METHOD EXPLORATION/ DEVELOPMENT.



FIGURE 30: WEST, S. (2015). THUMBNAILS OF SELECTED HALF-SCALE TOILE / DESIGN ROUGHS USED FOR GARMENT INSPIRATION.

The cube variations followed similar construction processes that became a common method used. Variations occurred through random placement of cut-out circles, and placement of reopened seams to provide openings for limbs, body or head, stimulating and expanding a model of creative shape investigation. This sample experimentation was successful in pushing further concepts of shape, silhouette and space, along with minimal cut and sew processes.

Through this phase of the project it became apparent that this was a design method, where decisions were based on the observed aesthetics of a potential garment, along with the way in which it was formed. It became difficult to distinguish the design from the pattern, as the unity became obvious and significant (McQuillan, 2012).

The intuitive and tactile relationship between hands and the cloth when draping generates sensory-led decisions that build the artefact. Some of these considerations include how the body moves, placement of limbs / anatomy, how does the wearer get into the artefact? Does the fabric flatter the body or accentuate it? The weight, texture and drape properties of the material are also considered:

What unites 'tactile sensations' in the hand and link them to visual perception of the same hand, and to perceptions of other bodily areas, is a certain style informing my manual gestures and implying in turn a certain style of finger movements, and contributing, in the last resort, to a certain bodily bearing. (Merleau-Ponty, 1962, p. 174)





FIGURE 31: WEST, S. (2015). HALF-SCALE ORGANZA CUBE DRESS; TRANSPARENT FABRIC WITH MINIMAL DRAPE QUALITIES WITH THE IDEAL NOT A SINGLE GARMENT STYLE, BUT COULD BE WORN IN VARIOUS WAYS, ULTIMATELY BECOMING A VERSATILE PIECE.

This exploration resulted in geometric pattern shapes that, when constructed and draped upon the body, provided intricate profiles and silhouettes. This translated the space between body and cloth through the fabric interaction on the figure, also triggering responses to the weight of the cloth, texture and fibre content.

Straight cuts dominate the creation process, dictating the garment outcome. The need to utilise all the fabric while cutting, using straight cuts as a way to mathematically achieve this goal, influences the pattern process more than the intention to use a particular shape. As the practice occurred, the more it was realised as an important driver behind decision making.

### 3.2.3 PHASE THREE: FULL-SCALE TOILES; TESTING OF THE 'CUBE' METHOD

Using the half-scale samples as inspiration, development continued into the next phase of the design process of full-scale toile making, using the half-scales as you would use sketching roughs<sup>10</sup>. It became apparent that this was an important stage, as design decisions permanently define the artefacts/garments. The cuts made to the cube were among the final acts made to the piece, transforming the cube artefact into a garment.

Set fabric width and length parameters were put in place to maintain a sense of control around the data creation and analysis, to test the method. The fabric was cut at the same length of 2metre, using the same width of calico each time. These strips were then used in different starting layout formations that would inform the final outcome.

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<sup>10</sup> The initial design ideas developed through sketching, referred to as roughs through the fashion design process.



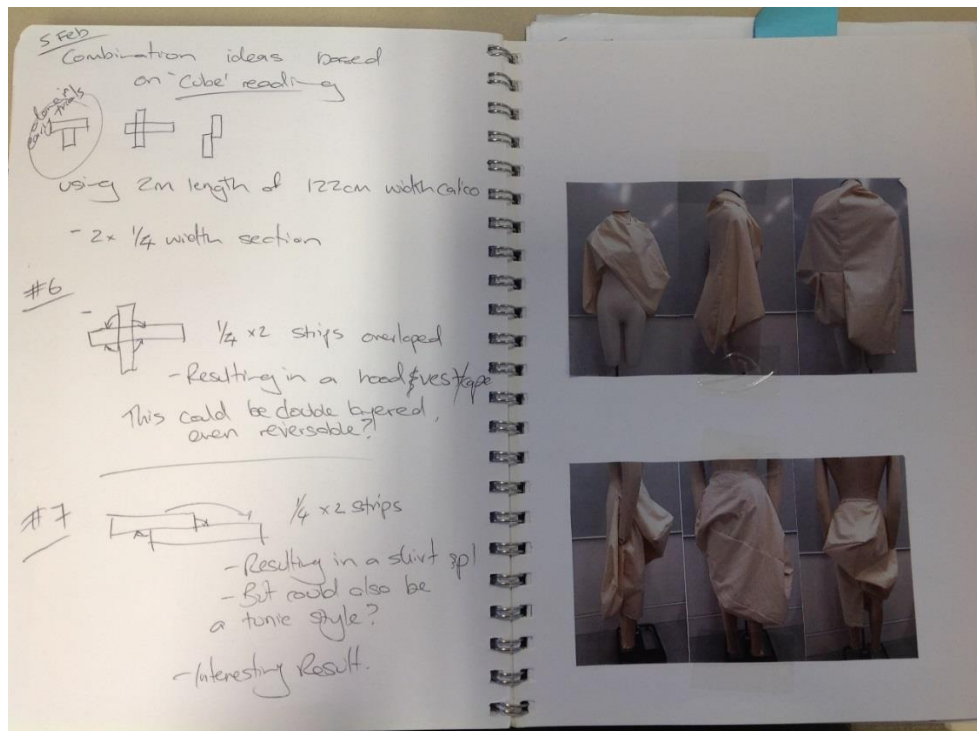


FIGURE 33: WEST, S. (2016). WORKBOOK DOCUMENTING FULL-SCALE CALICO'S.



FIGURE 34: WEST, S. (2016). PROCESS OF CALICO TOILE CUBE.



FIGURE 35: WEST, S. (2016). FULL-SCALE CALICO TOILES ON MODEL TESTING METHOD.





FIGURE 36: WEST, S. (2016). FULL-SCALE CALICO TOILES ON A MODEL, TESTING METHOD

## COMPUTER AIDED DESIGN - STYLECAD

With the research objective in mind; producing a pattern system that can be translated into a commercial setting, StyleCAD was chosen as the commercial platform to achieve this. This system allowed 1) artefacts to be deconstructed, retaining information through notching; 2) pattern shape and information to be documented through digitising; and 3) plotting to replicate the artefact, for mass production if required.

A *toile* was selected to take through this process to test the viability of the Cube Method. This *toile* was deconstructed and inputted into StyleCAD to develop a digital copy of the pattern that could be reproduced.

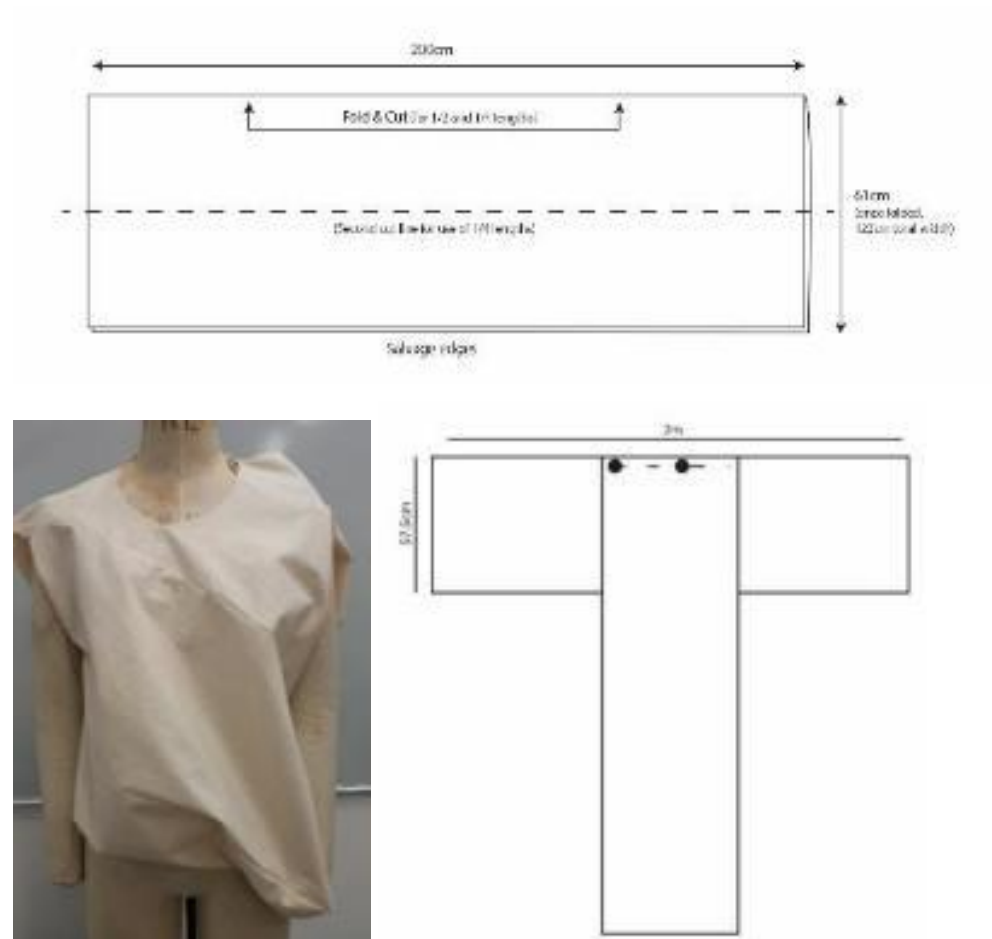


FIGURE 37: WEST, S. (2016). CALICO TOILE TO BE INPUTTED INTO STYLECAD.

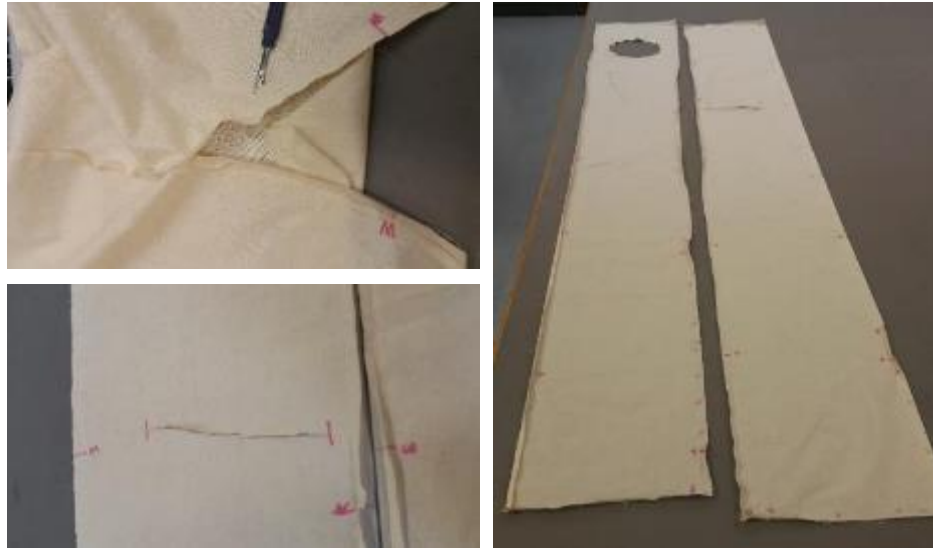


FIGURE 38: WEST, S. (2016). DECONSTRUCTING CALICO SAMPLE IN PREPARATION TO BE DIGITISED.

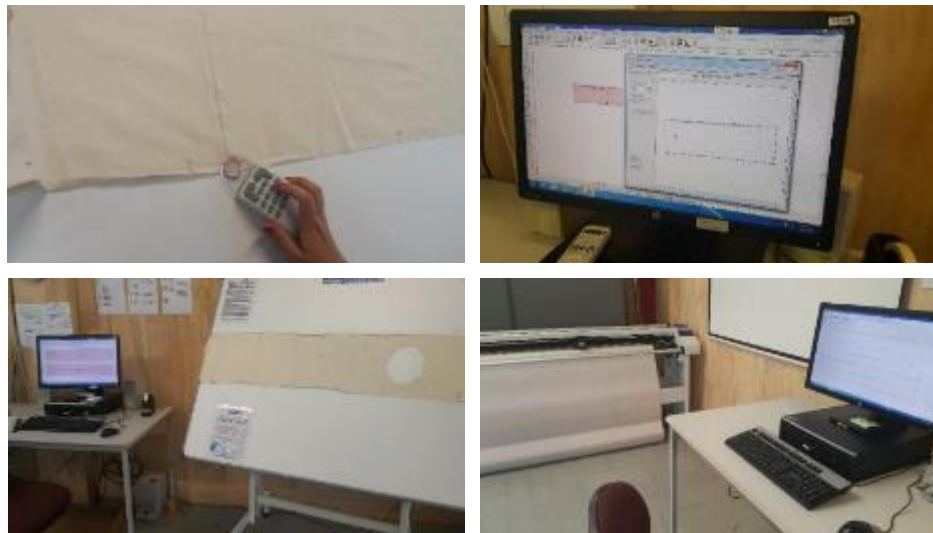
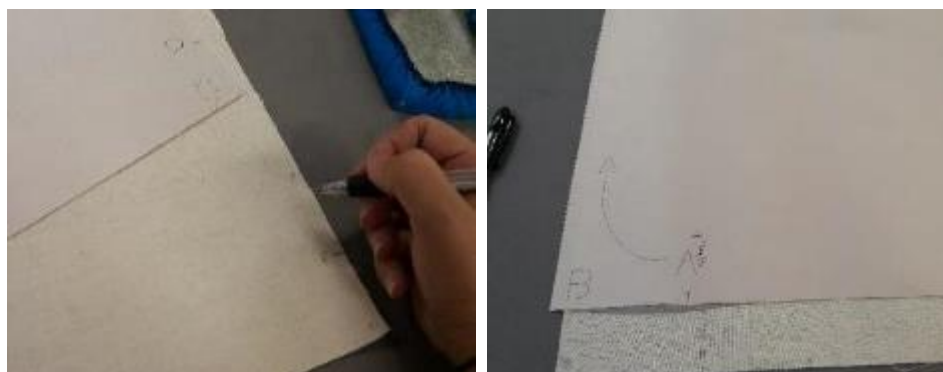


FIGURE 39: WEST, S. (2016). FULL PROCESS OF PATTERN INPUT AND OUTPUT. DIGITISING, CREATING PATTERN AND PLOTTING OF PATTERN USING STYLECAD.

Using the StyleCAD plotted patterns of the *toile*, the first trial pattern was sampled with the use of a notch identifier system. However, once notches were transferred, it became apparent that too many notches caused confusion. A notch tracking method was adopted of using a symbol; for example 'A' directly above a snipped notch, similar to that learnt from Shingo Sato (Sato, 2011).



It also became useful to draw the direction of the sewing construction, with an arrow, indicating where the starting point of construction was and which direction to move forward.



*FIGURE 40:* WEST, S. (2016). TRANSFERRING NOTCHES TO CUT PIECE AND DIRECTION OF STARTING POINT FOR CONSTRUCTION.



*FIGURE 41:* WEST, S. (2016). CUTTING OF PLOTTED PATTERN IN CALICO TO RECREATE TOILE.

However, once sewn, the majority of the notches became irrelevant after the starting notch, eventually becoming a couple of centimetres out from each other and no longer accurate. As a result of these findings, a simplification process to the visual language was achieved. For a pattern and garment to be reproduced, two notches and the direction of construction was needed. More precisely, a single notch (one snip) made to mark the beginning point and the finish being a double notch (two snips)<sup>11</sup>.

The prototype result was a replication of the original garment, due to neck and armhole placements. These openings became critical in the style output of the pattern. These bodily identifiers, the

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<sup>11</sup> These notches are common in conventional patternmaking. Single notches indicating front; double notches indicating back.

openings of neck and armholes, form the basis for a pattern to become a garment; they are the transition from fabric to artefact.



FIGURE 42: WEST, S. (2016). RECREATED CALICO TOILE USING STYLECAD REPLICATED PATTERN.

#### FROM CUBE TO GARMENT

The geometric pattern formations, such as 'the cube', allow for a three-dimensional shape to be draped and explored on the body, resulting in a volume and drape. The shape of the garment is responsive to the material in which it is applied. The fabric transparency, composition and weight have importance as it is difficult to separate these aspects from the fall and formation of the garment. Gravity alters heavier weighted fabrics differently to that of lighter weights, or stiff, soft, stretch or woven fabrics. How the fabric interacts with the form does intrinsically become a part of the method and process, furthering the organic nature of the designs.



FIGURE 43: WEST, S. (2014). COMPARISON OF DIFFERENT FABRICS DRAPE RESPONSE

The modelling of the method to communicate a three-dimensional formation process is vital for any replication to be achieved.

However the organic nature of the artefact allows for the freedom of variations to be achieved in the construction stage, even though it is repetition. Differentiations can result through the fabric materiality, such as stretching through handling pressures; fabric variances as corners are mediated, thus resulting in slight outcome variations.

A positive quality noted whilst working through to the final garments was the potential for each rendition to be unique and individual, even when repeated processes are applied to bulk base standards, through the variant making issues, but also through incremental movements of openings within the base cube or cuboid three dimensional forms.

The method and structure becomes much like that of origami, where the fabric is folded and connected on angles and edges to create a three-dimensional form from a flat two-dimensional surface. The use of 'origami' diagrams help to visually communicate the construction steps that need to be taken to result in a final artefact, if to be bulk produced. The step-by-step diagrams/working drawings are needed due to the nature of the artefacts. The conventional flat front and back view drawing of the design would not reflect the garment and its complexities, thereby creating boundaries in visual communication.

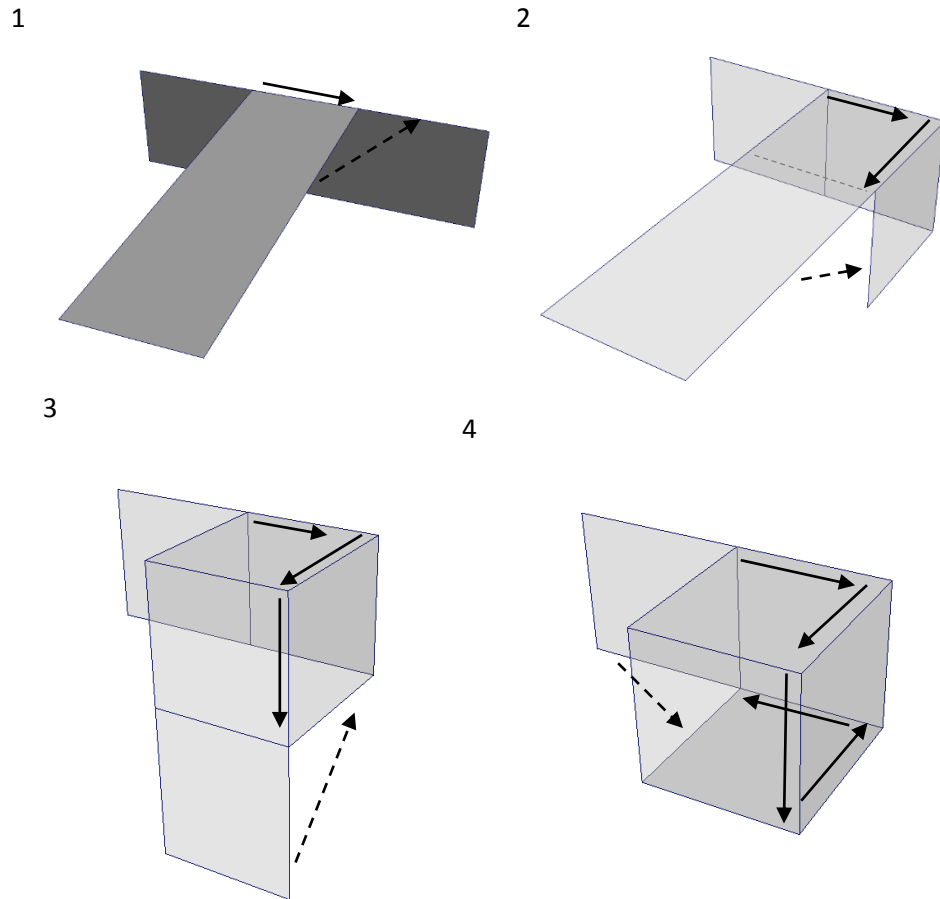


FIGURE 44: WEST, S. (2016). DIAGRAMMATIC DRAWINGS OF CUBE CONSTRUCTION USING TWO RECTANGLES.

Just as important as the diagrams of the artefact construction, is the Specification Sheet on which the garment details are recorded, whether this be a working copy produced through the *toile* stage, or the final polished version that would be sent to production along with the pattern. Both are vital forms of visual documentation, communication and process recording.

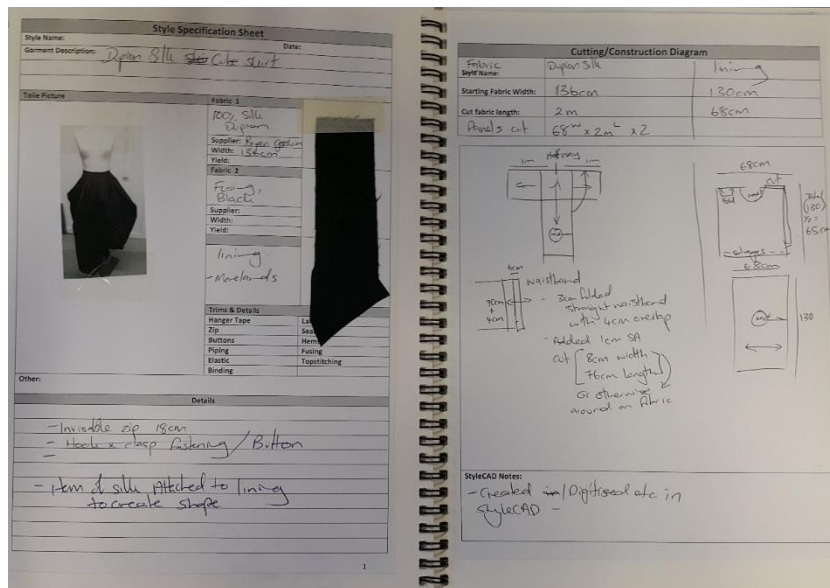


FIGURE 45: WEST, S (2016). 'IN PROGRESS' SPECIFICATION SHEET USED WITHIN WORKBOOK TO RECORD PATTERN AND CONSTRUCTION DETAILS.

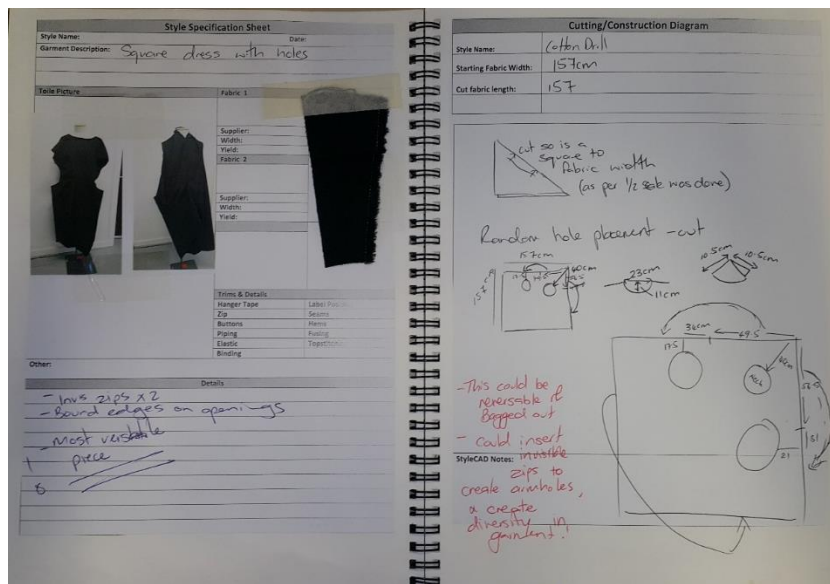


FIGURE 46: WEST, S. (2016). VERSATILE DRESS CREATION DEVELOPMENT

### 3.2.4 PHASE FOUR: DESIGN & TOILE DEVELOPMENTS

Further design and make questions, such as width and length of the fabric used, also affect the resultant size of the garment and alter the outcome of the design reached. Depending on the fabric dimensions, the pattern can be a 'one-size', or 'S-M&L' size, as it adjusts to fit. Garments can range from a Small to a Large before consideration has to be given to grading<sup>12</sup>.

Design aesthetic parameters<sup>13</sup> were set through the garment creation process, in order to maintain details that were cohesive with the integrity of the project. Fastenings, seam finishes, openings and other features needed to be organic, self-sufficient and incorporate no waste or minimal waste output where possible. It became hard to separate the design and the making phase, as each informed the other simultaneously.

Further testing occurred through varying fabric dimensions and properties, resulting in *toiles* that could be translated into final wearable pieces. Tacit knowledge gained from former experience and training helped to make choices around fabric selection, stylelines, folds, weight of fabric and movement of the body (Cross, 2006; Crouch & Pearce, 2012).



FIGURE 47: WEST, S. (2016).  
INVISIBLE ZIP IN INNER LEG SEAM, AN  
INVASIVE FORM OF FUNCTION, PANTS  
TOILE.



FIGURE 48: WEST, S. (2016). SELF-  
FABRIC TIE WAIST, PANTS TOILE.

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<sup>12</sup> Grading: the method used to increase or decrease the pattern size; e.g. converting a size 12 to either a 10 or 14 (Kunick, 1984).

<sup>13</sup> Refer to Appendix 2 for further details.



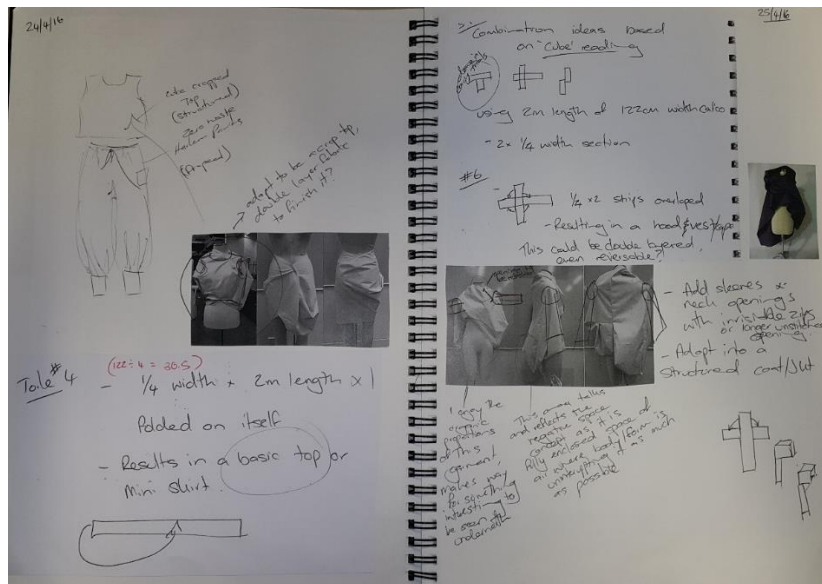


FIGURE 49: WEST, S. (2016). WORKBOOK SHOWING DEVELOPMENT OF CALICO TOILES INTO FURTHER DESIGN IDEAS.

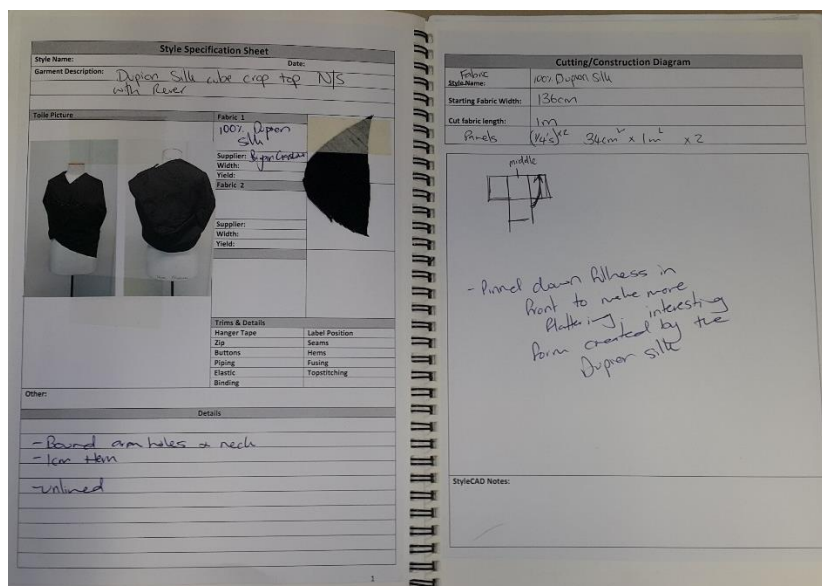


FIGURE 50: WEST, S. (2016). SILK CUBE TOP CREATION DEVELOPMENT







FIGURE 52: WEST, S. (2016). DRAPED SKIRT TOILE, LIGHT-WEIGHT TRANSPARENT LINEN.

Design decisions can be subjective, and difficult to justify when based on an individual's perception and world view (Cross, 2006). To answer 'why' a subjective decision was made requires true reflection and analysing of the process; even then it can be hard to verbalise and rationalise. As Swann (2002) identifies, "design research is tied to a domain that derives its creative energy from the ambiguities of an intuitive understanding of phenomena."

Artefacts explore the idea of the body being lost within the garment, leaving the viewer to guess locality based on prior understanding; or using transparency of the fabric to explain the body silhouette within the space created by the encapsulating artefact. The exclusion of figure-defining aspects or bodily suggestions within the form and pattern allows creativity with the way it is explored, worn and applied.

The artefacts cocoon the body, much as a building encloses around space and people (Quinn, 2003), developing an insulating and protective space that could be used to hide the body through a lack of suggested figure, or it could create more curiosity around the question of the figure and the need to explain where it is within the garment.



*FIGURE 53:* WEST, S. (2016). LONG DRESS WITH SHEER PANEL IN FINAL COLLECTION



*FIGURE 54:* WEST, S. (2016). CUBE DRESS ON MODEL FOR COLLECTION PHOTOSHOOT

Through this phase, the discovery to reuse cut fabric lengths to create new designs was discovered. For example, while evaluating the constructed cube dress in cotton drill, it felt heavy and bulky due to the fabric composition, so the desired garment was not achieved.

However, the garment is able to be re-claimed into another artefact, because minimal cuts and sewing had been done to the material.

The future versatility and transformability of an artefact is a positive finding in this method of practice; encompassing the idea that a garment can be repaired or redesigned by altering within itself, making it self-sustaining.



FIGURE 55: WEST, S. (2016). COTTON DRILL FULL-SCALE CUBE DRESS REPLICATION.

### 3.2.5 PHASE FIVE: FINAL COLLECTION

Using reflective practice, final pieces were able to be created based upon the *toiles* created through the development of the phases. The commercial aspect became implicit through the designing, as the research was proving a method that could be commercialised. The fabric type was identified as key in producing successful outcomes, determining the drape and structural properties that influence garment realisations and appeal.

The role of the reflective practitioner was important throughout the practice-based research, with the need to evaluate and process design decisions made along the way (Gray & Malins, 2004; Makela,

2011). Reflection-in-action became vital through each phase of the project, as working tactilely required judgements to be continuously made.

Pausing to reflect while working allowed identification and justification of the basis of judgements, from predicting how fabric behaves when pinned, to the best construction process. As O'Sullivan (2008) identifies, "Here meditation, or introspection, becomes a technology of transformation. It allows us to move from a narrow or reactive mode of being to one that is more open and creative." However, at times it also interrupted the flow of creativity, as the action of draping can also be a continuous one.

The concepts of movement, silhouette and spatial awareness translate through the pieces, as final fabrics and garment formations take place. Seeing them interacting with the body helps to solidify their place within the projects resolution outcomes. The monotone choice reflects and retains attention on the form, cut and shape of the artefact.



*FIGURE 56: WEST, S. (2016). DUPION SILK SKIRT IN MOTION, SHOWING MOVEMENT AND VOLUME OF CLOTH /GARMENT AS MODEL SPINS, LINKING TO INSPIRATION PHOTOSHOOT.*



FIGURE 57: WEST, S. (2016). FINAL EXHIBITION & SWINGTAGS WITH LASER CUT PATTERN CONSTRUCTION UNIQUE TO EACH GARMENT ATTACHED TO GARMENTS.

## PROJECT OUTCOMES

In evaluating this research, we must return to the objective of combining two-dimensional processes with the three-dimensional, in an effort to achieve minimal cut and sew garments that could be used in a commercial setting.

Through the use of a half-scale tailor's form, draping the cloth led to the development of the 'Cube Method'. Through this method, the conceptual underpinnings of the research were explored, continuing the path of inquiry. Through subsequent sampling and toiling to test the method as a system of patternmaking, certain project outcomes became apparent.

Firstly, it became obvious early in the research process that there is an unlimited amount of artefact outcome variations that could be achieved through the use of this method. This was demonstrated in both half-scale and full-scale samples. The variances that achieve this exciting point of difference is 1) the option of fabric width and lengths used; 2) the fabric properties, for example the texture, weight, composition, which affected garment outcomes; and 3) the combinations in which the cut lengths are assembled.

Secondly, it is worth noting that, through this method of three-dimensional design and patternmaking, it is possible to achieve minimal waste, and minimal cut and sew artefacts. This was achieved through remaining true to the original rectangular formation of conventional woven fabric. By keeping the cuts parallel to the edges of the fabric, minimal waste was achieved. The only waste made was through the cutting out of holes within the artefact. By achieving this outcome, it addressed the objective through draping to combat waste and labour intensive processes found in commercial production.

In conjunction with the minimal cutting as an output of this method, the concept of future transformability or versatility is introduced, adding to the sustainable approaches already noted above. Through

the idea that a garment can be repaired or redesigned by altering within itself, it becomes self-sustaining.

Lastly, the method proved it is possible to replicate three-dimensionally designed and drafted artefacts through a commercial platform StyleCAD, showing that the 'cube method' can be reproducible for mass production if desired.

In addition to proving an alternative approach to design and patternmaking, this method, developed through research-in-action, also achieved outcomes that reflect the underpinning conceptual themes.

Through the use of geometrics, the resulting artefact formations provide the void between body and cloth that best discuss the ethereal concepts of spatiality, silhouette and cloth-body interactions.

## CONCLUSION

"...the task of any rigorous intellectual and imaginative inquiry is not only to produce new insight, but also to realise how this can transform our knowledge of things we assume we already understand" (Sullivan, 2006).

Through this project, an understanding of design research methodologies was developed, assisting navigation through the uncharted territories that were discovered as the project progressed. Action research was the overarching methodology that guided this practice-based research. Through reflection-in-action, a greater awareness developed around personal practice, critical thinking and research (Crouch & Pearce, 2012). It was through a process of recognising and justifying when decisions were subjective or objective, or functional or technical, that can now be taken into future practice. Draping cloth onto a form was done with a heightened decision making awareness (Swann, 2002), while also embracing the organic nature of garment creation.



The 'cube method' that resulted as a consequence of this project answers the research objectives (as explained in the Project Outcomes), making it a successful project. The contribution this method provides is seen in the possibilities of production being conducted onshore, thus reducing the environmental impact while also contributing to labour opportunities. The inability to reproduce the design without the pattern or deconstructing a garment ensures that the intellectual property of the design is maintained, contributing to the success of the cube method.

The objectives were achieved through the translation of the three-dimensional designs into a commercial platform for replication through the use of a computer aided pattern-drafting system. This stage of the research revealed reproducible patterns and garment shapes, suitable for mass production.

Further research could be undertaken with this project exploring the potential in straight cuts from geometric shapes, advancing the cube method. Testing the method within situ to further back up the claims made within this project would be valuable to the integrity of the research.

Through this process I have learnt to trust my own practice and to be guided by intuitive understanding that has developed over my career. This helped me further understand how and why I work in the ways that I do, creating confidence as a designer-maker by realising and developing upon my aesthetic. This was evidenced through the final collection line-up that was exhibited. These pieces were created through learning to be free with fabric and trusting in my ability to create successful garments that were organic creative designs.

The pattern process of 'The Cube Method' was developed through the motions of exploration and becoming aware of how the cloth moves and responds to the body. The collection that resulted from this method shows the minimalistic aesthetic that I wanted to achieve; the vision that I had in my mind. The exhibition of the

collection also reflected this minimalistic approach, through the way the garments were displayed.

Overall, the project was successful in answering the research question, while also generating excitement around approaching garment creation in a new, interesting and sustainable way that has potential to be explored further in a commercial environment.

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## APPENDICES

## APPENDIX 1: THUMBNAILS OF PHOTOSHOOT

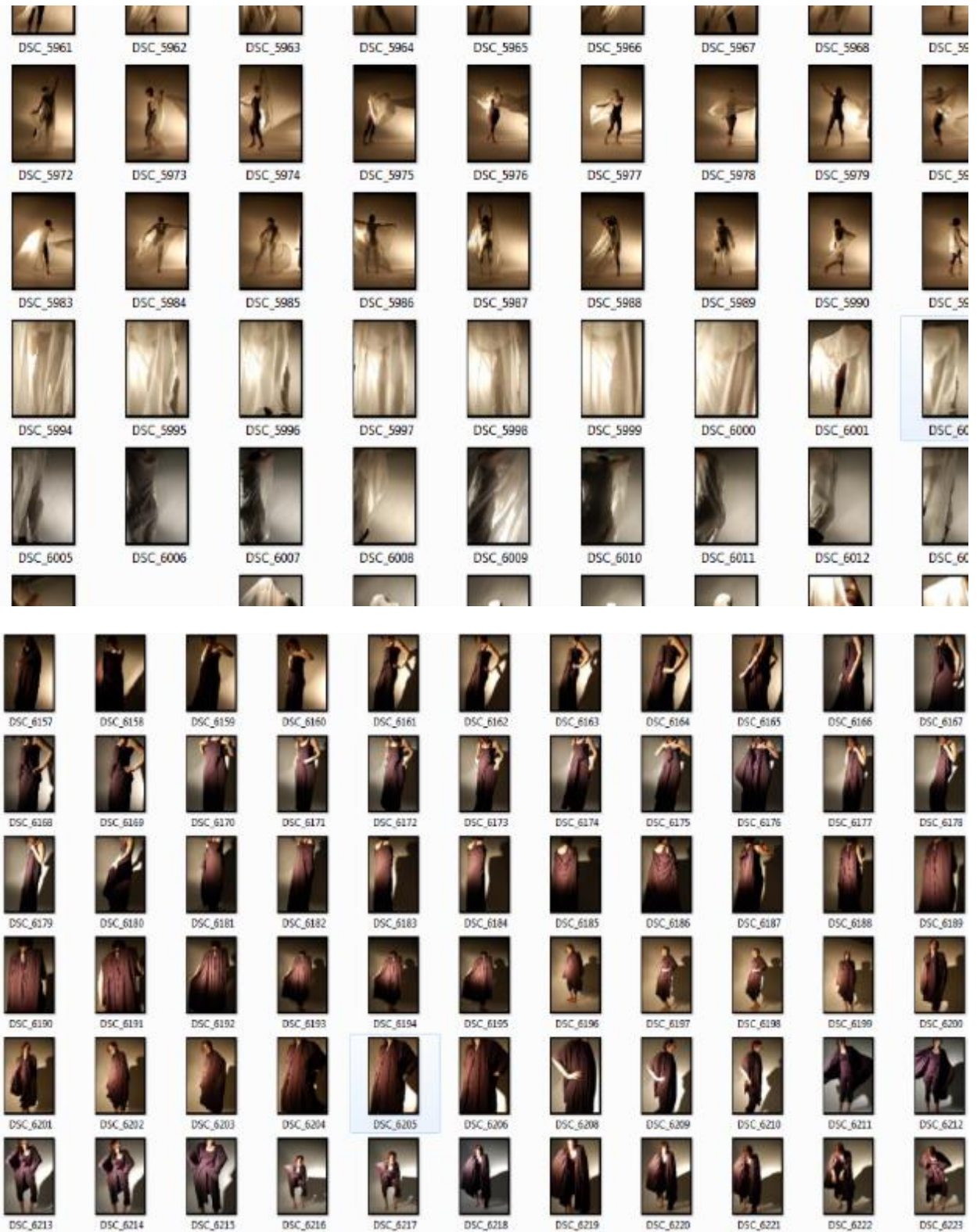





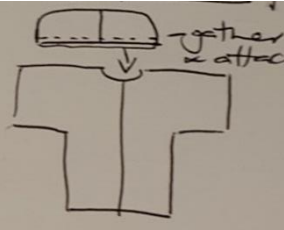

FIGURE THUMBNAILS OF SELECTED PHOTOGRAPHS OUT OF THE 702 TAKEN, CAPTURED IN INSPIRATION PHOTOSHOOT EXPLORING CLOTH AND BODY RELATIONSHIP. (WEST, 2015)

## APPENDIX 2: DESIGN PARAMETERS AS OUTLINED IN NOTES RECORDED 26 APRIL 2016

- *Invisible zips to be used if needed as a form of opening/fastening, to keep the integrity of the fabric and purpose of collection in focus.*
- *To use self-fabric to finish details in garment*
- *Seams simply overlocked to reduce labour intensive construction. If this is not possible alternative methods will be explored*
- *Not to shy away from using cut fabric waste as a detail added to garment, eg pocket, as long as it does not detract away from the integrity of the garment.*
- *No added accessories like metal eyelets etc. to be used, that the use of a non-evasive method to be considered first e.g. a buttonhole. This ensures that the garment remains organic and minimalistic.*
- *Fabric needs to show shadows, contrast within this aspect, what happens when light shines through the fabric and the outline of the form is seen, like that seen in the fabric photoshoot. These principles need to be reflected in the collection.*
- *Weight, texture and fabric properties become most important within fabric choice. The use is necessary within this collection to show all aspects of garment shapes, cut and drape aspects of project through to structured shapes. To also prove that the method can be commercial in different fabric types. The contrast of these aspects need to be represented in garment form.*

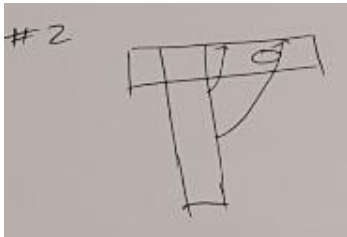

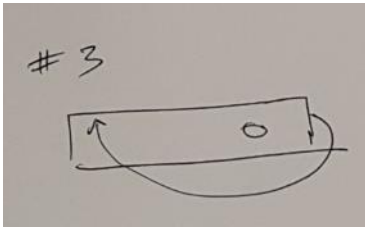

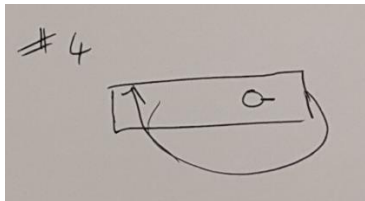

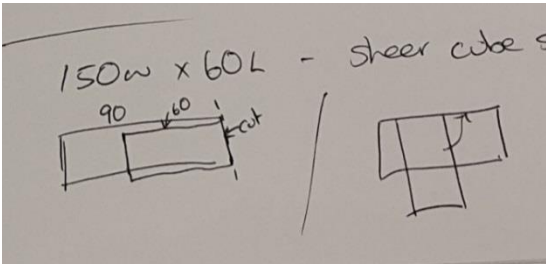




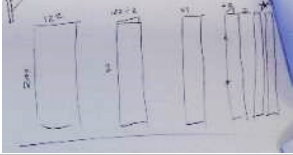

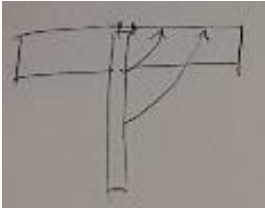

### APPENDIX 3: CHART OF EXPERIMENTATION

| Name / Number                | Fabric Info   | Cutting diagram  | Garment Outcome  | Comments   |
|------------------------------|---|--|--|--|
| ½ scale Wrapping trial       | Chiffon   |  |   | 1 rectangle length of fabric wrapped around the body to form a garment.<br><br>Leading to idea of using only rectangles, and using the half scale tailors form   |
| Full Scale draped Coat       | 2m x2m<br>Blue Knit   |    |   | Using 1 square fabric piece tried draping on full scale tailors form to see if a one-piece garment was possible through drape with no 2D sketching. Using only 3D processes  |
| ½ scale Coat with big collar | Blue Cotton<br>112cm width x 75cm length<br><br>(in full scale it would convert to 150cm x 244cm) |   |  | At this sample point it became clear that shapes / garments were becoming predictable. Needed to move away from the restriction of set garment list and forgetting about zero waste methods to let creativity flow.<br><br>Considered a fail |

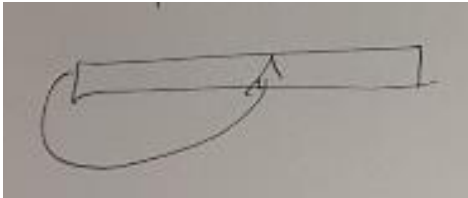



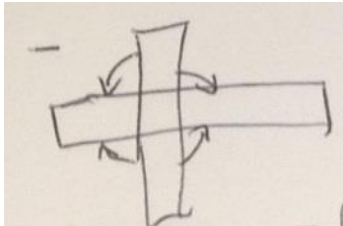

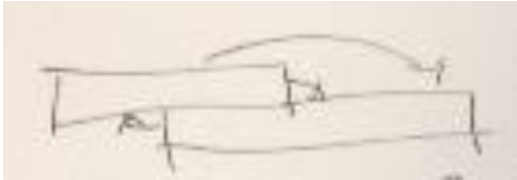

|  |  |   |  |   |
|--|--|---|--|---|
| <p>½ scale square with holes</p> <p>1<sup>st</sup> trial</p> | <p>112cm width x 75cm length</p> <p>Cut into square with random hole placement</p> |   |   | <p>First experiment using straight cuts and holes to create an artefact.</p> <p>Considered successful, a pivotal point within project</p> |
| <p>“</p>   | <p>“</p>   |   |   | <p>Square fabric piece with random placed holes, draped on half scale in different formations to realise potential garment shapes</p>     |
| <p>½ scale 2 rectangles</p> <p>1<sup>st</sup> trial</p>      | <p>112cm x 75cm</p>  |  |  | <p>Square cut in half to create 2 rectangles, then attached in different ways to created variety of artefact formations</p>               |

|  |  |   |  |  |
|--|--|---|--|--|
| <p>½ Scale<br/>Cube Dress</p>                    | <p>Organza</p> <p>Square cut in half to<br/>create 2 rectangles</p>  |   |   | <p>Sample shown at AUT. significant<br/>outcome influencing direction of<br/>experimentation of project</p>  |
| <p>Full scale<br/>Cube Dress</p>                 | <p>2m length fabric @ 115cm<br/>wide</p> <p>Cut in half:<br/>2m x 57cm (x2)</p> <p>Blue Cotton</p>                     |   |   | <p>Using ½ scale cube dress as starting<br/>point, converted into full scale</p>  |
| <p>#1</p> <p>½ scale<br/>cube<br/>variations</p> | <p>112cm x 75cm<br/>Blue Cotton</p>  |  |  |  |

|   |  |  |   |   |
|---|--|--|---|---|
| #2<br><br>½ scale<br>cube<br>variations | "  |    |    |   |
| #3<br><br>½ scale<br>cube<br>variations | "  |    |    |   |
| #4<br><br>½ scale<br>cube<br>variations | "  |    |   |   |
| #5<br><br>½ scale<br>cube<br>variations | Chiffon<br><br>150cm Wide x 60cm<br>length |  |  | Some interesting combinations, also<br>sheer quality of fabric bringing<br>transparency to object |

|  |  |  |  |  |
|--|--|--|--|--|
| Full scale<br>Cube Dress                             | White Chiffon<br>140cm wide x 2.2m length  |    |   | Proportions and gravity have altered<br>this shape going from a ½ scale to<br>full scale |
| #1<br><br>Full Scale<br>cube<br>variations<br>toiles | Calico (122cm width)<br>122cm wide @ 2m lengths<br> |    |   | Used 2 x ¼ widths at 2m lengths  |
| #2<br><br>Full Scale<br>cube<br>variations<br>toiles | Calico (122cm width)<br>122cm wide @ 2m lengths<br><br>2 x half lengths cube.  |    |   | ½ cube top, as per half scale trial  |
| #3<br><br>Full Scale<br>cube<br>variations<br>toiles | Calico (122cm width)<br>½ and ¼ widths (starting<br>122cm) x 2m lengths  |  |  | Resulted in ¾ sleeve tunic by<br>unpicking seams to allow openings<br>as req.            |



|    |  |  |   |  |  |
|----|--|--|---|--|--|
| #4 | Calico (122cm width)<br><br>Full Scale<br>cube<br>variations<br>toiles | ¼ width x 2m length.<br>Folded on itself |   |   | Results in a basic top (crop) or short skirt   |
| #5 | Calico (122cm width)<br><br>Full Scale<br>cube<br>variations<br>toiles | 122cm width x 2 m length,<br>cut in half |   |   | Results in a cube dress variation  |
| #6 | Calico (122cm width)<br><br>Full Scale<br>cube<br>variations<br>toiles | 2 x ¼ width sections @ 2m<br>lengths     |   |   | Resulting in a hood vest / cape. This<br>could be double layered, even<br>reversible? Adapted into a jacket? |
| #7 | Calico (122cm width)<br><br>Full Scale<br>cube<br>variations<br>toiles | 2 x ¼ sections @ 2m<br>lengths           |  |  | Resulting in a skirt sample but also<br>could be a tunic style? Interesting<br>result                        |

#### Appendix 4: Final collection photoshoot



FIGURE 58: WEST, S. (2016). LONG DRESS WITH SHEER PANEL



FIGURE 59: WEST, S. (2016). DUPION SILK CUBE TOP





FIGURE 60: WEST, S. (2016). WOOL CROSS-OVER CAPE



FIGURE 61: WEST, S. (2016). ZERO-WASTE TROUSERS



FIGURE 62: WEST, S. (2016). VERSATILE DRESS



FIGURE 63: WEST, S. (2016). VERSATILE DRESS, CAN BE WORN AT LEAST 6 WAYS. PHOTOS DEMONSTRATING SOME WAYS TO WEAR IT



FIGURE 64: WEST, S. (2016). LINEN TOP



FIGURE 65: WEST, S. (2016). LINEN SKIRT



FIGURE 66: WEST, S. (2016). CUBE DRESS



## APPENDIX 5: COLLECTION EXHIBITION



