DESIGN ITERATIONS THROUGH FUSION OF ADDITIVE AND SUBTRACTIVE DESIGN

A thesis submitted to the College of the Arts of Kent State University in partial fulfillment of the requirements for the degree of Master of Arts

by

Gordon Stumpo

May 2016
Thesis written by

Gordon Stumpo

B.A., Washington State University, 2014
M.A., Kent State University, 2016

Approved by

Vince Quevedo, Thesis Supervisor

Brian Peters, Committee Member

Margarita Benitez, Committee Member

Dr. Catherine Amoroso Leslie, Graduate Studies Coordinator, The Fashion School

Dr. Linda Hoeptner Poling, Graduate Studies Coordinator, The School of Art

Mr. J.R. Campbell, Director, The Fashion School

Dr. Christine Havice, Director, The School of Art

Dr. John Crawford-Spinelli, Dean, College of the Arts
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF FIGURES</td>
<td>vi</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>xi</td>
</tr>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>xii</td>
</tr>
<tr>
<td>CHAPTER</td>
<td></td>
</tr>
<tr>
<td>I. INTRODUCTION</td>
<td></td>
</tr>
<tr>
<td>Concept</td>
<td>13</td>
</tr>
<tr>
<td>Design Framework</td>
<td>13</td>
</tr>
<tr>
<td>Surface and Structure Framework</td>
<td>14</td>
</tr>
<tr>
<td>Additive Design</td>
<td>18</td>
</tr>
<tr>
<td>Subtractive Design</td>
<td>18</td>
</tr>
<tr>
<td>Tension</td>
<td>18</td>
</tr>
<tr>
<td>Price Point</td>
<td>19</td>
</tr>
<tr>
<td>Personal Skills &amp; Background</td>
<td>19</td>
</tr>
<tr>
<td>Problem Statement &amp; Significance of the Study</td>
<td>19</td>
</tr>
<tr>
<td>Research Questions</td>
<td>21</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>21</td>
</tr>
<tr>
<td>II. LITERATURE REVIEW</td>
<td></td>
</tr>
<tr>
<td>Apparel Price Point Categories</td>
<td>24</td>
</tr>
<tr>
<td>Discount Level</td>
<td>24</td>
</tr>
<tr>
<td>Budget or Mass Market Level</td>
<td>25</td>
</tr>
<tr>
<td>Moderate Level</td>
<td>25</td>
</tr>
<tr>
<td>Contemporary Level</td>
<td>25</td>
</tr>
<tr>
<td>Better Level</td>
<td>26</td>
</tr>
<tr>
<td>Bridge Level</td>
<td>26</td>
</tr>
<tr>
<td>Designer Level</td>
<td>26</td>
</tr>
<tr>
<td><strong>Haute Couture Level</strong></td>
<td>27</td>
</tr>
<tr>
<td>Surface Design</td>
<td>27</td>
</tr>
<tr>
<td>Beading &amp; Embroidery</td>
<td>28</td>
</tr>
<tr>
<td>Applique</td>
<td>29</td>
</tr>
<tr>
<td>Rouleau</td>
<td>29</td>
</tr>
</tbody>
</table>
Digital Textile Prints.................................................................29
Armholes, Sleeves, & Gussets..................................................30
Bias Cut..................................................................................33
Fast Fashion..........................................................................34
Slow Fashion..........................................................................34

III. METHODOLOGY................................................................36
    Ideation & Sketching.............................................................36
    Process of Elimination..........................................................38
    Pattern Creation...................................................................39
    Sample Creation...................................................................39
    Process of Refinement & Corrections.....................................40
    Sourcing & Costing Decisions.................................................41
    Digital Renderings.................................................................41
    Custom Digital Print Process...............................................45
    Fabric Preparation & Cutting...............................................47
    Sewing, Pressing, & Finishing...............................................48

IV. RESULTS............................................................................49
    Dress 1 – Princess Kimono Gusset Dress.................................49
    Dress 2 – Zip Front Sleeve Yoke Dress.........................................49
    Dress 3 – One Shoulder Knit Dress..............................................50
    Coat 1 – Opera Coat.................................................................51
    Coat 2 – Empire Waist Coat....................................................51
    Coat 3 – Raglan Lapel Coat.....................................................52
    Gown 1 – Bandeau Halter Gown................................................52
    Gown 2 – Cowl Halter Gown...................................................53
    Gown 3 – Bias Cut T-Back Halter Gown.....................................54

V. DISCUSSION.......................................................................55
    Dress 1 – Princess Kimono Gusset Dress.................................55
    Dress 2 – Zip Front Sleeve Yoke Dress.........................................56
    Dress 3 – One Shoulder Knit Dress..............................................57
    Coat 1 – Opera Coat.................................................................58
    Coat 2 – Empire Waist Coat....................................................59
    Coat 3 – Raglan Lapel Coat.....................................................60
    Gown 1 – Bandeau Halter Gown................................................61
    Gown 2 – Cowl Halter Gown...................................................62
    Gown 3 – Bias Cut T-Back Halter Gown.....................................63
    Overall Collection....................................................................64
    Limitations............................................................................65
    Sustainability........................................................................65
    What was successful?............................................................66
    What was challenging?..........................................................67
    What did I learn?....................................................................68
    Future Areas of Study .............................................................68
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The Stumpo Surface and Structure Scale</td>
<td>16</td>
</tr>
<tr>
<td>2. Surface emphasized design</td>
<td>16</td>
</tr>
<tr>
<td>3. Structure emphasized design</td>
<td>16</td>
</tr>
<tr>
<td>4. The Stumpo Surface and Structure Style Summary</td>
<td>17</td>
</tr>
<tr>
<td>5. Types of gussets</td>
<td>31</td>
</tr>
<tr>
<td>6. Sewn-in gusset</td>
<td>32</td>
</tr>
<tr>
<td>7. Set-in sleeve</td>
<td>32</td>
</tr>
<tr>
<td>8. Raglan sleeve</td>
<td>32</td>
</tr>
<tr>
<td>9. Kimono sleeve</td>
<td>32</td>
</tr>
<tr>
<td>10. Grain lines</td>
<td>33</td>
</tr>
<tr>
<td>11. G1 initial design concept</td>
<td>36</td>
</tr>
<tr>
<td>12. G1 next stage concept</td>
<td>36</td>
</tr>
<tr>
<td>13. G1 final design concept</td>
<td>36</td>
</tr>
<tr>
<td>14. G1 final rendering</td>
<td>37</td>
</tr>
<tr>
<td>15. Initial digital collection rendering</td>
<td>43</td>
</tr>
<tr>
<td>16. Final digital collection rendering</td>
<td>44</td>
</tr>
<tr>
<td>17. Initial digital print sample</td>
<td>46</td>
</tr>
<tr>
<td>18. Final digital print sample</td>
<td>46</td>
</tr>
</tbody>
</table>
19. Initial digital print scale test .............................................................................................................47
20. Initial digital print scale test .............................................................................................................47
21. First sample review ..........................................................................................................................71
22. Second sample review ......................................................................................................................71
23. Third sample review ..........................................................................................................................72
24. Fourth sample review .......................................................................................................................72
25. G1 initial drape ..................................................................................................................................73
26. G1 sample 1 front view ......................................................................................................................73
27. G1 sample 1 back view .......................................................................................................................73
28. G1 sample 1 side view .......................................................................................................................73
29. G1 sample 2 back view ......................................................................................................................74
30. G1 sample 2 front view .......................................................................................................................74
31. G1 sample 2 side view .......................................................................................................................74
32. Dress 1 back view .............................................................................................................................76
33. Dress 1 front view .............................................................................................................................76
34. Dress 1 sleeve detail ..........................................................................................................................76
35. Dress 1 sleeve gusset .........................................................................................................................76
36. Dress 2 back view .............................................................................................................................77
37. Dress 2 front view .............................................................................................................................77
38. Dress 2 sleeve detail ..........................................................................................................................77
39. Dress 3 back view .............................................................................................................................78
40. Dress 3 front view .............................................................................................................................78
41. Dress 3 neckline detail
42. Coat 1 back view
43. Coat 1 front view
44. Coat 1 pocket detail
45. Coat 2 back view
46. Coat 2 front view
47. Coat 2 neckline detail
48. Coat 2 sleeve detail
49. Coat 3 back view
50. Coat 3 front view
51. Coat 3 lapel detail
52. Coat 3 pocket detail
53. Gown 1 back view
54. Gown 1 front view
55. Gown 1 bodice detail
56. Gown 2 back view
57. Gown 2 front view
58. Gown 2 bodice detail
59. Gown 3 back view
60. Gown 3 front view
61. Gown 3 side detail
62. Dress 1 cost graph
63. Dress 2 cost graph ........................................................................................................................................................................87
64. Dress 3 cost graph ........................................................................................................................................................................88
65. Coat 1 cost graph ...........................................................................................................................................................................89
66. Coat 2 cost graph ...........................................................................................................................................................................90
67. Coat 3 cost graph ...........................................................................................................................................................................91
68. Gown 1 cost graph ...........................................................................................................................................................................92
69. Gown 2 cost graph ...........................................................................................................................................................................93
70. Gown 3 cost graph ...........................................................................................................................................................................94
71. Dress 1 surface & structure scale analysis .................................................................................................................................96
72. Dress 1 surface & structure style summary analysis ..................................................................................................................96
73. Dress 2 surface & structure scale analysis .................................................................................................................................97
74. Dress 2 surface & structure style summary analysis ..................................................................................................................97
75. Dress 3 surface & structure scale analysis .................................................................................................................................98
76. Dress 3 surface & structure style summary analysis ..................................................................................................................98
77. Coat 1 surface & structure scale analysis .................................................................................................................................99
78. Coat 1 surface & structure style summary analysis ..................................................................................................................99
79. Coat 2 surface & structure scale analysis .................................................................................................................................100
80. Coat 2 surface & structure style summary analysis ..................................................................................................................100
81. Coat 3 surface & structure scale analysis .................................................................................................................................101
82. Coat 3 surface & structure style summary analysis ..................................................................................................................101
83. Gown 1 surface & structure scale analysis .................................................................................................................................102
84. Gown 1 surface & structure style summary analysis ..................................................................................................................102
85. Gown 2 surface & structure scale analysis .................................................................................................................................103
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Collection plan</td>
<td>14</td>
</tr>
<tr>
<td>2. Final collection plan</td>
<td>38</td>
</tr>
<tr>
<td>3. Dress 1 cost detail</td>
<td>86</td>
</tr>
<tr>
<td>4. Dress 2 cost detail</td>
<td>87</td>
</tr>
<tr>
<td>5. Dress 3 cost detail</td>
<td>88</td>
</tr>
<tr>
<td>6. Coat 1 cost detail</td>
<td>89</td>
</tr>
<tr>
<td>7. Coat 2 cost detail</td>
<td>90</td>
</tr>
<tr>
<td>8. Coat 3 cost detail</td>
<td>91</td>
</tr>
<tr>
<td>9. Gown 1 cost detail</td>
<td>92</td>
</tr>
<tr>
<td>10. Gown 2 cost detail</td>
<td>93</td>
</tr>
<tr>
<td>11. Gown 3 cost detail</td>
<td>94</td>
</tr>
</tbody>
</table>
ACKNOWLEDGMENTS

Sincere thanks to Mr. Quevedo, my thesis advisor. His input and guidance has truly helped me grow and push my designs to the next level. Thank you to my thesis committee members, Margarita Benitez and Brian Peters, for encouraging me to think critically and design thoughtfully. I would also like to thank Dr. Catherine Leslie for allowing me to share my process and gather my thoughts along the way, through all versions of this thesis. Thank you to J. R. Campbell and The Kent State Fashion School, without whose support creation of this collection would not be possible. Lastly, to my friends, family, and design comrades from Washington to Arkansas, to New York and beyond; wherever you are in this world, you continue to inspire me.
CHAPTER 1
INTRODUCTION

Concept

This collection seeks to explore the process of design in a systematic way, through the use of an additive and subtractive design framework. Centering on three iterations of three garments, a total of nine looks provide a base for this study. Through creation of three dresses, three coats, and three gowns, each set of three will include one additive design, one subtractive design, and a third iteration blends the two styles together. While these iterations are based upon one another, the final pieces each have a distinct look due to fabric choice, color choice, and added details.

Design Framework

The use of an additive and subtractive framework provides a design challenge since the focus and scope is more limited than a traditional collection. This framework requires the designer to think about the design process in a formulated manner to help focus creative energy. This approach forces the designer to solve a worthy design challenge without having to follow other methods, such as mood boards and inspiration collages. This framework is technique-driven and users in and out of the apparel industry can easily adapt their personal skill sets to it, since numerous design techniques exist.

With this in mind, this study focuses on three iterations of three garments using both additive and subtractive design (see Table 1). These additive and subtractive design techniques focus on both the structure and the surface of the garment, which allows the
potential for more creative options than looking at surface alone. The collection plan is comprised of the following:

<table>
<thead>
<tr>
<th>Design</th>
<th>Additive Version</th>
<th>Mix Version</th>
<th>Subtractive Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dress</td>
<td>Dress 1</td>
<td>Dress 2</td>
<td>Dress 3</td>
</tr>
<tr>
<td>Coat</td>
<td>Coat 1</td>
<td>Coat 2</td>
<td>Coat 3</td>
</tr>
<tr>
<td>Gown</td>
<td>Gown 1</td>
<td>Gown 2</td>
<td>Gown 3</td>
</tr>
</tbody>
</table>

Table 1. Collection plan

Surface and Structure Frameworks

The creation of two other new design frameworks helped guide the design process and aided in final analysis. These are the *Stumpo Surface and Structure Scale* and the *Stumpo Surface and Structure Style Summary*. In the *Stumpo Surface and Structure Scale*, design is comprised of surface and structure, which are both always present in any fashion design. That is to say, the surface or embellishment of the textile and the physical shape or structure the textile takes on are both integral parts of design (see Figure 1). Surface and structure can influence one another and are not always equal in ratio; some designers emphasize surface while others focus on structure of the garments, while others will do some amount of both (see Figure 2 & Figure 3).

Different ratios of complex to simple and surface to structure create a specific set of styles that can help identify a specific brand or designer, as seen in the *Stumpo Surface and Structure Style Summary* (see Figure 4). Different combinations of emphasis on surface and
structure lead to four main style types, in which a designer or brand may consciously or unconsciously design. These style types include Styles A, B, C, and D:

- Style A: complex surface & complex structure
- Style B: complex surface & simple structure
- Style C: simple surface & complex structure
- Style D: simple surface & simple structure
Figure 1. The Stumpo Surface and Structure Scale. Design is comprised of surface and structure, which are both always present in any fashion design; surface and structure can influence one another and may or may not be in equal proportions.

Figure 2. Surface emphasized design

Figure 3. Structure emphasized design
Figure 4. The Stumpo Surface and Structure Style Summary. Different styles of design are possible through different emphasis on surface and structure; these four main styles are found in the work of (from left to right) Alexander McQueen, Naeem Khan, Zac Posen, and Calvin Klein.
Additive Design

Additive design includes a variety of techniques that add to the surface or structure of a textile or garment. Additive surface techniques may include: painting, dyeing, beading, embroidery, digital textile prints, applique, pleating, and fabric manipulations. Structurally, additive design can include gussets, seam insertion, extensions, and fullness.

Subtractive Design

Subtractive design includes a variety of techniques that remove from the surface or structure of a textile or garment. Subtractive techniques may include laser cutting, seaming, laser etching, and discharge dyeing. Structurally, subtractive design can include floating seams, removal of traditional seam lines, and removal of luster (using other face of textile).

Tension

Tension is an important part of this collection, in both a literal and metaphorical sense. Literally, tension between the arms and shoulder joints of the body and the armhole and sleeves of a garment can put a lot of tension on clothing. This tension can potentially cause strain on the fabric and limit movement of the wearer's arms. This collection explores alternatives to the standard armhole and sleeve, in efforts to better align the garment with the body and provide more aesthetic design options. Also, strategically adding and removing tension can add unique design details to the finished pieces. In particular, the gown iterations are based on one, two, and three points of tension, along with other pieces in the collection. Metaphorically, tension serves as a co-theme to addition
and subtraction, which guides the motif selection in the digital print and adds unique design details to individual looks.

Price Point

The price point of this collection is designer level, which allows for hand finished details, higher quality fabrics, and more complex sewing and construction than lower price points. In particular, the types of armholes, pockets, and sleeves created for this collection require higher levels of accuracy and more time to produce than lower price points.

Personal Skills & Background

I have worked with a variety of designer level brands in New York to develop my personal skill set. These brands have a special focus on formal wear and often use embellishment. I have studied designer and couture level techniques, which is the highest level of quality available. I am well versed in a variety of traditional embellishment techniques, including hand and digital versions.

Problem Statement & Significance of the Study

Traditional approaches to design are effective for some students and designers and often center upon mood boards and inspiration collages. These approaches focus on intangible feelings and emotions of the collection, which are important and helpful to explain to consumers and the apparel industry what the brand is about. However, in this time of oversaturation in the market, and with fast fashion brands having a large impact on sales, there is a need for interesting fashion choices which still meet consumer needs.
Successful combinations of additive and subtractive techniques can benefit both the artistic/creative and the industrial/business/production sides of apparel design and production. Designers working in the apparel industry can maximize creative explorations while maintaining existing production practices and meeting production guidelines. Combining additive and subtractive design techniques increase the number of tools a designer can use to create. The more tools a designer has increases the potential for more interesting and captivating designs. In terms of industry and production, using additive and subtractive techniques together may or may not be viable if the strengths of each technique are not capitalized upon. These creative techniques require additional time and resources, as compared to simple designs, so if they are to add value in production each must be used thoughtfully and efficiently.

Capitalizing upon this design framework could fill a need in the apparel industry for unique fashion with deliberate aesthetic and structural choices. As more consumers are tiring of fast fashion, they are seeking out an authentic fashion experience. These types of designs could fill that niche and become a middle ground between mass market and one-of-a-kind designs. Looking at a return to slow fashion, utilizing a technique and structure based design framework makes the garment itself more important. With specific focus on the structure and surface of the design, each finished design takes a step away from the pressure of the continuous fashion cycle. By exploring design through this framework, the business can better connect to consumers with interesting fashion choices; these choices exist as part of the fashion cycle, but are not solely driven by this cycle. Brands with multiple price points can balance additive and subtractive design techniques to better align
production cost with consumer willingness to pay. In this way, the design is not sacrificed and costs are properly adjusted.

This fusion of additive and subtractive techniques would allow the potential for a new product line, a new market, or a new aesthetic. These designs also have the potential to pair with current production practices, increase the arsenal of design techniques, and enhance an already successful label in all aspects of its business from design through to production.

The analysis of this collection includes costing and production information for each design as well as the collection as a whole. This collection expands my personal skills in design, patternmaking, surface design, and construction, and allows me to explore a variety of aesthetic sensibilities.

**Research Questions**

- How can additive and subtractive surface design techniques combine in the context of a handcrafted designer level fashion brand?
- Does this combination of techniques allow the potential for a new product line, a new market, or a new aesthetic that fits with production?

**Definition of Terms**

- **Collection**: an group of objects gathered for study or exhibition; a set of apparel designed for sale usually linked to a particular season (Collection, 2015)
• **Design**: design is comprised of both surface and structure. That is to say, the surface or embellishment of the textile and the physical shape or structure the textile takes on are both equally important parts of the final creation (author definition)

• **Doff**: to take off a piece of clothing (Doff, 2015)

• **Don**: to put on a piece of clothing (Don, 2015)

• **Fast fashion**: fast fashion refers to apparel products that are based on popular runway designs and produced quickly to get in stores in the least amount of time possible (Brodish, S., Nixon, N., & Cirka, C., 2011)

• **Haute Couture (or couture)**: couture garments are made one at a time, using more hand sewing, labor-intensive finishing details, higher quality fabrics, and personalized fitting alterations than the majority of widely available ready-to-wear garments available to the average consumer (Shaeffer, 2011)

• **Look book**: a set of photographs displaying a fashion designer’s new collection, for use in marketing and documenting the collection (Look book, 2015)

• **Niche**: a particular kind or group of people that a business can successfully identify in order to sell its products (Niche, 2015)

• **Motif**: a single or repeated design, image, or pattern (Motif, 2015)

• **Rise**: the amount the body of a garment moves when the wearer moves his or her arms; each type of sleeve causes some amount of rise, depending on the type of sleeve and fabric used (Armstrong, 2009)

• **Slow fashion**: slow fashion is a movement that counters fast fashion that promotes purchasing better-made clothing less often that lasts longer than cheap clothing (Jung, S., & Jin, B., 2014)
• **Surface design:** surface design is a term used to describe a variety of techniques that modify or embellish the surface, structure, or color of a textile or garment (Lenor, 2012)

• **Technical package:** a set of information sheets detailing all required garment specifications that is used in the process of garment manufacturing (Myers-McDevitt, 2014)

• **Technique:** a way of doing something by using special knowledge or skill (Technique, 2015)

• **Zero Waste:** a design approach in which little to no fabric or materials are wasted in creation of a garment, which is linked to the growing sustainability movement (Liu, 2010)
Apparel Price Point Categories

Varieties of price points exist within the apparel industry, in which both production and retail costs increase from discount to designer levels (Fasanella, 2009). Price points are generally categorized in the following order, though definitions are flexible, with haute couture being the highest level possible (Apparel Search, 2016):

- **Discount**: Ross/TJ Maxx, no set price range
- **Budget or Mass Market**: Walmart $3-$60
- **Moderate**: Levi’s/Gap $5-$200
- **Contemporary**: BCBG/Rebecca Taylor/Nordstrom $30-$300
- **Better**: Jones NY/Perry Ellis $50-$500
- **Bridge**: DKNY/Polo $100-$800
- **Designer**: Naeem Khan $300-$10,000+
- **Haute Couture**: Christian Dior/Chanel $500-$50,000+ (even up to $9 million)

**Discount Level**

Discount level refers to products that can originate from any price point, but are sold at a discount (Apparel search, 2016). Stores like Ross, Marshalls, and TJ Maxx specialize in this type of product, and there is not set cost range for this category, since higher original cost items will still sell higher than lower cost items once they are...
discounted (Apparel search, 2016). Discounts can arise from quality issues, damaged goods, over purchasing, unpopularity of style, or other reasons (Fasanella, 2009).

**Budget or Mass Market Level**

Budget or mass market level refers to low price and quality of clothing than most of the market (Fasanella, 2009). These items are sold in stores like Walmart and are built to meet a basic clothing need for consumers (Apparel search, 2016). All items would be sold at a retail price of less than $100, and are not made to last over time (Fasanella, 2009).

**Moderate Level**

The majority of clothing available for sale is at the moderate level, for brands like Levi’s and the Gap (Fasanella, 2009). Macy’s and Dillard’s carry products at this level, and most children’s clothing is at this price point (Fasanella, 2009). The quality and cost is higher than that of budget items, but is still relatively affordable for most consumers (Apparel search, 2016).

**Contemporary Level**

Clothing at the contemporary level features high quality fabrics and finishes and is trendier and more modern than other price points (Fasanella, 2009). Stores like Nordstrom carry products at this level, which caters to the everyday fashion needs of consumers (Apparel search, 2016). Prices are higher at this level, but these styles are designed to last over time and pair well with other items consumers may own (Apparel search, 2016).
Better Level

Better level refers to a medium to high priced level of clothing (Apparel search, 2016). Prices are higher than those of department stores, which may or may not signify higher quality (Apparel search, 2016). This is the cutoff point for almost all children’s apparel and is usually the lowest price point for a designer level brand to create additional product lines (Fasanella, 2009).

Bridge Level

Bridge level products feature high quality fabrics and include career separates (Apparel search, 2016). Some designers produce secondary clothing lines at this level, in order to connect to consumers who cannot afford the designer level products (Fasanella, 2009). These lines may link to a well-known designer but are named strategically to indicate they are not the full designer level; for example, Donna Karan has bridge line DKNY and Ralph Lauren has Polo Ralph Lauren (Apparel search, 2016).

Designer Level

Designer level refers to a higher price and quality of clothing than most of the market (Fasanella, 2009). Some famous designers mass produce their general clothing lines at this level, in order to support their couture product lines (Fasanella, 2009). For other designers or labels, the designer level is their highest quality and they may exclusively work at this level. Clothing at this price point is usually made of higher quality fabrics and may include some hand finished details, which are reflected in a higher retail cost (Schaeffer, 1994).
**Haute Couture Level**

*Haute couture* refers to an exclusive level of custom made clothing from a designer who is certified with approval from the *Chambre Syndicale* in France (Martin, 1995). Starting in Paris during the mid-1800’s, the *Chambre Syndicale* maintains very specific and rigid requirements that a designer must pass before bearing the official title of *haute couture* (Shaeffer, 2011). These requirements include designing made-to-order garments for individual clients with several fittings, employing fifteen of more employees in a workshop (or *atelier*) in Paris, and presenting a collection in Paris twice a year each with outfits for both day and evening (Troy, 2003). Since not every brand or designer is able to accomplish these requirements, an air of exclusivity surrounds those who successfully make *haute couture*. While not all high-end custom designers will carry the official title of *haute couture*, they still can be considered and referred to simply as couture. Like *haute couture*, custom couture garments are made one at a time, using more hand sewing, labor-intensive finishing details, higher quality fabrics, and personalized fitting alterations than the majority of ready-to-wear garments available to the average consumer (Shaeffer, 2011). Custom made couture is especially prominent for public figures, including royalty, socialites, and celebrities.

**Surface Design**

Surface design is a term used to describe a variety of techniques that modify or embellish the surface, structure, or color of a textile or garment (Lenor, 2012). These techniques evolve throughout history, and exist in cultures around the world (Ramirez, n.d.). Many of these techniques have historical roots (Tortora, 2010). Some techniques are
modernized with machine use, while others are still done by hand in the traditional methods of past centuries. Traditional hand-based surface design techniques include: beading, embroidery, quilting, painting, dyeing, macramé, and many variations of pleats or tucks. Popular digital surface design techniques include: embroidery, digital textile prints, laser cutting, and 3D printing.

**Beading & Embroidery**

In high-end designer fashion, many companies use traditional hand techniques of beading and embroidery (Shaeffer, 2011). Hand beading and embroidery is often reserved for special occasions and evening wear, due to high production costs and detailed production requirements. The chosen design must be carefully transferred to the fabric, and the types of thread, needles, and beads must be pre-determined and will all affect the final product (Vaine, 2011). Embroidery and beading can be done in-house, or sent out to professional companies. One well-known establishment that specializes in high-end custom beading and embroidery is the house of Lesage. Located in Paris, Lesage creates custom designs that are unique to the designer who commissioned them, working with notable high fashion designers such as Chanel, Schiaparelli, Balmain, Christian Dior, Louis Vuitton, Christian Lacrioix, and countless others (Kamistis, 2000). Within embroidery alone, there are a myriad of variations and options, each with its own history and aesthetic (Vaine, 2011). One popular embroidery technique is channel stitching, which involves several repeating stitch lines, running parallel to one another (Vaine, 2011). When done by machine, channel stitching can add a special touch of threadwork to any design in a streamlined way, since only one type of stitch is utilized.
**Applique**

Applique and reverse applique are embellishment techniques that are based upon layering fabrics, with strategic cutting or trimming of the layers to reveal the fabric surface hidden underneath (Mutnick, 2015). Applique has deep roots in many cultures and can be traced back throughout the history of embellishment (Avery, 1978). Applique can take many shapes and forms, with geometric or floral motifs being most popular (Mutnick, 2015). Applique techniques require high levels of precision and patience in application and usually take more time than simpler embellishments (Avery, 1978).

**Rouleau**

Rouleau, pronounced roo-low, is an embellishment technique that uses narrow tubes of bias cut fabric to add to a textile surface, or creates a new textile by stitching the tubes together (Grey, 2015). Starting in France in the 1600's, rouleau has many forms and variations (Grey, 2015). Rouleau designs are often soft and flowing, as the bias grain of the tubes favors curvilinear designs. These lacelike structures add a distinctly delicate touch that is actually quite strong and can make up entire garments (Grey, 2015). Rouleau tubes can be hand stitched together and used as further embellishment, or used to join two pieces of fabric with an intentional gap between them. This technique can be referred to as floating seams, since the fabric panels within the garment do not appear to be connected.

**Digital Textile Prints**

Almost every level of fashion production utilizes digital prints, which have allowed designers a new layer of creative exploration and have significant popularity in the fashion
industry (Bowles, M. and Issac, C., 2012). Digital textile prints are popular among fashion
designers because they have a shorter production time and give designers another
opportunity to create and design (Bowles, M. and Issac, C., 2012). Since designers can use
programs like Adobe Photoshop, which the designers are already familiar with, they can
create custom prints without needing intensive special training or having to purchase new
software. This is empowering for designers because it builds upon previous knowledge and
skills they possess. Many types of pigments and inks are available, and printing on both
natural and synthetic fibers alike is extremely feasible with today's technology (Bowles, M.
and Issac, C., 2012).

Digital printing may help improve sustainability of production by reducing the
amount of wasted water and chemicals that can potentially be disposed of improperly
(Bowles, M. and Issac, C., 2012). In particular, the Kornit© Allegro printer uses 100% plant
based, nontoxic biodegradable inks and has eliminated all pre and post chemical
treatments that are usually required in the printing process (Kornit, 2015). In addition, the
Allegro printer uses no water during or after printing, which even further increases the
sustainability of this type of printer (Kornit, 2015).

Armholes, Sleeves, & Gussets

The basic set-in sleeve is found in shirts, jackets, coats, and dresses and is
characterized by a tubular sleeve that attach to the body of the garment via circular seams
(Armstrong, 2009) (see Figure 7). This sleeve is a popular choice in production since it is
standard and easy to identify. While this is a common sleeve, on fitted designs movement of
the arms can be restricted and can cause the rest of the garment to move (Armstrong,
This movement is referred to as rise, and each type of sleeve has some amount of rise, depending on the type of sleeve and fabric used (Armstrong, 2009).

Adding a gusset, a square or circular shaped piece of fabric that is sewn under the arm, can reduce this strain, but does not always solve the problem completely or fit the contours of the arm (see Figure 6). The grown-on gusset is another variation, which is an extension of the sleeve itself, eliminating a sewing operation and seam bulk under the arm (Stanbury, 2015) (see Figure 5).

Another option to reduce armhole strain is to replace the set in sleeve with a raglan or kimono sleeve. A raglan sleeve connects all the way to the neckline and shares the underside of a set in sleeve (see Figure 8). Kimono sleeves are cut in one with the main part of the garment, which eliminates the traditional shoulder seam found in set in sleeves (see Figure 9). Both of these sleeve types interact with the body slightly differently and can be subtle or dramatic.
Figure 6. Sew-in gusset

Figure 7. Set-in sleeve

Figure 8. Raglan sleeve

Figure 9. Kimono sleeve
Bias Cut

Every textile has three main grain lines: the lengthwise grain, the crosswise grain, and the bias grain (Shaeffer, 1994) (see Figure 10). The lengthwise grain follows the pre-finished edge of a textile, called the selvedge, along the entire length of the fabric. The crosswise grain is 90 degrees perpendicular to the selvedge edge, parallel to the fixed width of the cut fabric edge. The bias grain can be any grain line that is not length or crosswise, but in general ranges from 35 to 65 degrees off of the lengthwise grain. True bias is exactly 45 degrees off of the lengthwise grain and offers the most stretch out of all grain lines (Armstrong, 2009).

![Figure 10. Three main grain lines used in apparel and textile based items](image)

Most garments are cut on the lengthwise or straight grain, which is the most stable; however, cutting on the bias grain causes the textile to stretch in a way it normally would not be able to (Armstrong, 2009). A bias cut gown, for example, allows a woven textile to follow the contours of the body in the way a knit or stretch textile would. A bias cut
garment is harder to sew than those cut on straight of grain and often require more fabric (Armstrong, 2009). Popular during the 1920’s and 1930’s, bias cut gowns were a Hollywood staple until wartime fabric restrictions made these luxurious designs fall out of favor with wartime conservation efforts (Shaeffer, 1994). Bias cut garments have since returned as a classic form of eveningwear, though concerns of wasted fabric are still a concern for some.

Fast Fashion

Fast fashion refers to apparel products that are based on popular runway designs and produced quickly to get in stores in the least amount of time possible (Brodish, S., Nixon, N., & Cirka, C., 2011). Fast fashion originated during the mid-1980’s and gained huge momentum during the late 1990’s and early 2000’s with stores like H&M, Forever 21, and Zara (Cortez, M., Nguyen, T., Doan, A., Zagita, B., & Vegafria, E., 2014). These apparel items are usually produced with lower quality fabrics and are considered to be disposable (Cortez, M., et al, 2014). Because of lower production standards, these stores are able to replicate clothing of other designers and sell them before the original designers can. These business and production practices create low priced products that appeal to the youth market, but also raise some questions on the sustainability of such practices (Brodish, S., et al, 2011).

Slow Fashion

While fast fashion is strong business, there has been recent trend to purchase better-made clothing less often that lasts longer; to buy and wear slow fashion (Jung, S., & Jin, B., 2014). Slow fashion challenges the unsustainable methods of fast fashion, and seeks
to improve social, environmental, and business practices within the apparel industry (Brodish, S., et al, 2011). While slow fashion relates to the sustainable green movement and eco-fashion, which started in the 1960’s, it does have a slightly different focus (Brodish, S., et al, 2011). Instead of focusing on removing chemicals from production and evaluating working conditions in factories, slow fashion looks at the broader production and consumption cycles to encourage quality production over quantity of production (Jung, S., & Jin, B., 2014). Slow fashion examines how people engage with fashion items and seeks to better meet these needs (Langdown, A., 2014). Slow fashion suggests that designers should more thoroughly experience the design process and release designs when they are ready, instead of hastily making design decisions due to production deadlines (Langdown, A., 2014). Slow fashion encourages designers to make deliberate aesthetic choices to create accessible fashion options with interesting details. It is worth noting that as production quality increases in fashion, so does the price. The higher cost of slow fashion than fast fashion items may deter some consumers from purchasing these items, since consumers usually look for the lowest price (Langdown, A., 2014). There may be a need for consumer re-education, to enable slow fashion to make a bigger impact.
CHAPTER III

METHODOLOGY: COLLECTION DESIGN PROCESS – CONCEPT TO CREATION

Ideation & Sketching

In total, it took approximately 628 sketches to develop this nine look collection. Many hours, days, and weeks of thinking, sketching, and researching went into the ideation phase of this creation process, with each look having several iterations (see Figures 11-14). The themes of addition, subtraction, and tension drove many of the creative decisions, in particular a desire to create and test non-traditional armhole and sleeve combinations. While I do not take credit for inventing the raglan or princess kimono sleeves, for example, I did find novel ways to utilize these classic structures in my designs, with strategic changes for which I have not found exact equals.

Figure 11. G1 initial design concept

Figure 12. G1 next stage concept exploring tension points on the body, skirt fullness reduced

Figure 13. G1 final design concept, bandeau gown with draped front skirt, open back, and front slit
Figure 14. Final rendering of G1 bandeau gown to guide physical creation
A three by three grid helped track the iterations of additive and subtractive design and proved to be a useful tool in the ideation stage. This grid changed frequently and was easy to update (see Table 2).

<table>
<thead>
<tr>
<th>Design</th>
<th>Additive Version</th>
<th>Mix Version</th>
<th>Subtractive Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dress</td>
<td>Digital textile print</td>
<td>Addition of new armhole gusset and back skirt fullness; strategic removal of part of traditional armhole seam</td>
<td>Relocation of traditional armhole seam, flipped face removes luster</td>
</tr>
<tr>
<td>Coat</td>
<td>Beading embellishment and modified raglan yoke armhole</td>
<td>Collar added as part of the sleeve; pocket is extension of front panel; channel stitching detail on pocket</td>
<td>Floating seams with rouleau at lapel</td>
</tr>
<tr>
<td>Gown</td>
<td>Stitched rouleau detail at bodice</td>
<td>Use of digital print with glove-sleeves combo</td>
<td>Flipped face bias cut, emphasizes style lines</td>
</tr>
</tbody>
</table>

Table 2. Final collection plan

Intensive efforts were made to design garments that would allow the surface and/or structure of the garment to be a vehicle for additive and subtractive design. A balance was struck between embellishment and silhouette, keeping visual integrity and production requirements in mind. While some of the additive and subtractive elements required more skill and time to create, they are strategically used in order to maximize the investment and overall effect.

Process of Elimination

Several rounds of eliminating sketches improved the designs and cohesiveness of the collection. What were at one point quick pen sketches slowly evolved into refined iterations, eventually making their way into Photoshop for further refinement and ease of viewing. With all nine sketches on the same page digitally, it was much quicker to make
small adjustments and see how those adjustments held up with the collection as a whole. It was also much easier to share these sketches with others when they were all on one screen, instead of flipping back and forth between pages in a sketchbook.

**Pattern Creation**

After approval and selection of the final nine sketches, a sample pattern was made for each look. Some designs were created via flat pattern method on paper, while others were first draped in fabric, then transferred to paper afterwards (see Figure 25). All designs fit industry size 6 dress forms, which is a size 2 or 4 in retail sizing. All garments are the same size for cohesive presentation and to follow practices of the apparel industry.

**Sample Creation**

When the first draft of each pattern was complete, a sample of that design was created (see Figures 21-22). This physical sample was used to check fit, balance, and proportion of the finished design on professional dress forms. Creation of the sample also gave a preview of how easy or difficult it would be to sew the real garment, and informed the correct assembly order for that piece. For example, on one dress the sleeve may need to be joined to the bodice before sewing the neckline, whereas another dress may have a completely different assembly order.

In addition, sample swatches of the surface design techniques showed if the combinations are possible, successful, and work with the chosen materials. Once the technique was refined in the sample, preparation of the final fabrics began. The technique samples also gave an idea of how long it would take to complete for the final design.
Process of Refinement & Corrections

After fixing initial visual and proportional issues, a second sample was cut and sewn (see Figures 23-24). This second set of samples was worn by live models to check the movement and comfort of each design, and to see how each piece interacted with the human form (see Figures 26-28). In particular, the non-traditional armholes were tested to check ease of movement by having the model move her arms up and down, as well as seeing the level of difficulty in donning and doffing each look. Details like pockets, hoods, and gloves required additional checks for functionality, beyond solely aesthetics.

Once all fitting notes were made the paper pattern was adjusted accordingly and a new sample was created and once again fit on a live model (see Figures 29-31). This cycle continued until each design was completely refined and all major fit issues were solved. Among all nine looks, 31 different samples were created, with an average of three to four samples per look. Each new sample represented changes to the structure, proportion, and silhouette that led to a stronger final design.

Once a sample was corrected, I took a photograph of it to create a digital rendering later on in the process and to document this process. The surface design samples also needed adjustments in technique or materials used to create them. For example, after creating the original rouleau embellishment and reverse applique samples, I found a better way to transfer the design to the fabric and reduce repetitive motion. Both of these are important in a production setting, and can save time and money in the fashion industry, while helping make better costing estimates.
Sourcing & Costing Decisions

Some designers source all fabrics before they choose the designs, while others may choose fabrics after all designs are finalized (Schaeffer, 1994). In this collection, fabric research and selection occurred while the garment samples were being created, allowing more flexibility and options in sourcing. After key materials were identified, swatches were ordered to check quality, weight, and luster and see how they look when paired with one another.

Supporting structural materials, stabilizers, and linings were also taken into consideration. Finally, closures and notions were determined, since it is important that the wearer be able to properly don and doff each look. The final selection of fabrics and materials in this collection were mainly from New York, featuring mostly silk and wool fabrications. Selected materials all had some sort of textural component, and both sides of the fabric were usable. Since this collection is geared towards higher end consumers, the materials are of high quality and appropriate for this market segment. It is important to note that I was not eligible for wholesale costing or discounts, since this was a small scale production run. All costing information provided is accurate, but is higher than what an established factory or designer would pay.

Digital Renderings

As the samples were being refined, so too were the fabric choices and color palette. Color choice was intentionally limited due to the bright metallic accents and mix of textures, allowing the detail work to show through. Once I had a photograph of the final garment sample, and of potential fabric options for that sample, I used Photoshop to see
what each piece might look like in the final fabric and colors (see Figures 15-16). Being able
to see all 9 options together was extremely helpful and made it much easier to
communicate with others than if I only had sketches or renderings. Hand or digital sketches
are helpful, but seeing the actual photos of the samples gives a much better idea of what the
final pieces would look like.

Some fabric choices were easier to make than others, with costing being a main
factor. One strong example of this was when the color of one of the gowns changed from
lilac purple to olive green (see Figures 15-16); the cost per yard of the green was half that
of the purple, with no discernable difference in quality. Because the green was a better
color and a lower cost, it was the final choice for that look, and was suitable as an accent
fabric in other looks.
Figure 15. Initial digital collection renderings with lilac as primary accent color
Figure 16. Final digital collection renderings with olive as primary accent color
Custom Digital Print Process

Digital print fabric is a great way for designers to add a custom touch to their collections. These prints usually add value to the final garment since they are usually exclusive and only used by that designer or brand. Since virtually any image can be digitally printed onto fabric, I had to decide how I wanted my print to look. The market is oversaturated with classic prints such as flowers and stripes, so I knew my print had to be something more interesting. Looking back at the co-theme of tension, pearls came to mind, since pearls are created under tension and pressure within the oyster. After photographing a pile of pearls, I was able to manipulate the placement, size, and color of each one to create an initial print (see Figure 17). Further refinement led to a seamless repeat across the surface of the fabric; strategic touches of color in the print help tie together the variety of fabrics and colors found throughout the collection (see Figure 18). Photoshop images showed how the print would look on the body and revealed the initial repeat was too large (see Figure 19), so the scale was reduced (see Figure 20).

For this collection, I wanted to digital print on silk jersey knit fabric. It turns out that this fabric is popular to print on in England and Europe, but extremely hard to find in the United States. I had not anticipated there would be a big challenge to find someone who could print on this fabric, which slowed down the process and delayed my timeline. Ordering from international printers was an option, but with the condensed thesis time frame, delays from customs would have been disastrous. Instead, I was able to work with a printer in New Jersey called Papilio Prints. This company worked with me and special ordered a silk jersey that was the exact weight I was looking for. This company uses a Kornit© Allegro printer, which uses non-toxic and biodegradable inks, and has no pre or
post print processing. This includes water and harmful chemicals, which save time, resources, and pollution. After receiving the printed fabric, I performed standard abrasion and wash tests. Since the ink did not wash off or fade, this printed fabric is a sustainable option that will withstand the garment construction process and hold up over time.

Figure 17. Initial digital print sample

Figure 18. Final digital print sample
Fabric Preparation & Cutting

Before sewing could occur, the final fashion fabric was prepared. This included removing wrinkles or folds, possibly stabilizing, and inspecting the fabric for any flaws that must be cut around. All pieces were cut by hand following a simple production marker in efforts to reduce textile waste, both in terms of resource allocation management and sustainable production practices. All fabric scraps were kept, and most were usable as
embellishment in other looks, or as pockets and parts of lining. Even strips of the selvedge edge of the fabric were used to stabilize seams, reducing some waste and eliminating the need to purchase separate woven seam tape. While this collection was not zero waste, the amount of wasted fabric and supplies was small, much less than the average.

Sewing, Pressing, & Finishing

All garments were sewn on an industrial sewing machine, completely on my own. Great care was taken during the pressing stages, since careful pressing creates a better finished product. All hems were finished by hand, in keeping with the higher price point, which adds value and makes them invisible.

Before sewing could begin, the surface design embellishments were added, streamlining the production process and improving accuracy of the design. Completion of these techniques ranged from 45 minutes to several hours, after which, the embellished piece could join the body of the garment. Some looks were finished in one studio session, while others were worked on in multiple sessions over a period of days. On average, each look took one and a half to two days of work time to complete.
CHAPTER IV

RESULTS

Dress 1 – Princess Kimono Gusset Dress

This design is a bateau neck, long sleeve, knee length dress with a flat front skirt and flared back skirt (see Figures 32-33). The dress sleeve features a variation of the princess seam kimono sleeve armhole with a new version of a grown on gusset (see Figures 34-35 & Figure 90). This unusual type of armhole allows a fitted silhouette without limiting the wearer’s arm movement. This armhole and sleeve combination follows the contours of the arm and shoulder better than a set in sleeve and actually increases arm movement for the wearer. The sleeve is made up of four panels, the two largest forms the top of the sleeve and are cut in one with the body of dress, causing the body of to be on straight of grain and the sleeve to be on a bias grain. The two under panels are cut on straight of grain, causing the gusset portion to be on a bias grain. By strategically placing bias grain in these locations, the curved under panel fits the underarm cavity smoothly.

This dress is made from metallic gold wool, which has a buoyant hand, helping give the back of the skirt a lot of movement. A hidden detail in this dress is a strap that goes behind the upper thigh, keeping the front of the dress flat. Without this strap, the dress would not have a crisp silhouette or a flat front, and the back would not flare as nicely.

Dress 2 – Zip Front Sleeve Yoke Dress

This is a V-neck, long sleeve dress with an exposed separating zipper going down the center front (see Figures 36-37). Style lines cross the bodice and create sharp points as
they meet at the back of the dress. Part of the sleeve is combined with the front and back yoke, creating a dropped shoulder seam yoke sleeve (see Figure 38 & Figure 91). Since the top part of the sleeve was removed, the extended dropped yoke from the bodice slightly changed the angle of how the sleeve hangs.

This dress is made from metallic grey wool and both sides of the fabric are used, providing a nice contrast between the matte and metallic faces of the fabric. The front zipper was hand dyed to match the grey wool, creating a new olive gold metallic finish on the metal, which harmonizes well with the other pieces in the collection. Stopping the zipper several inches above the hem of the dress allows the wearer to easily walk while wearing this fitted of a skirt.

**Dress 3 – One Shoulder Knit Dress**

This dress is an asymmetric, knee length, one shoulder dress with an open back (see Figures 39-40 & Figure 93). The front of the dress is held up by the one sleeve that wraps around the back of the neck (see Figure 41). This unusual construction elevates a simple jersey dress into an engineered garment, which relies on the shape of the body to take proper form. The back of the dress falls into soft folds at the waist, mimicking the many parallel strands of a pearl necklace.

This dress is made from custom digital print silk jersey, featuring the pearl motif. Since the ground fabric is white silk jersey, it allows the colors of the print to show up better; however, if stretched too much it becomes too sheer for some people. Underlining with a plain black jersey solves this problem and improves comfort, modesty, and durability.
Coat 1 – Opera Coat

This is an update on the classic opera coat, which features a raised, built-in collar, floor length hem, center back pleat, special extension pocket, and raglan sleeves (see Figures 42-43 & Figure 94). Instead of adding on a separate collar or creating a collar from the front of the coat, the collar was cut as an extension of the sleeve, creating an unusual design detail and a novel method of construction. The back pleat is slightly exaggerated to allow for more movement and visual interest. The top opening of the pocket is part of the center front panel, providing a designer touch to a functional pocket (see Figure 44).

This coat is made from the same gold metallic wool as one of the dresses but, in this case, both sides of the fabric are utilized. Both the pocket and back pleat showcase the matte ginger brown side of this bright metallic wool and the seam lines of the pocket further highlight this contrast. Rows of parallel channel stitching on the pocket add a subtle touch to this dramatic coat, without distracting from the design as a whole.

Coat 2 – Empire Waist Coat

This coat features an empire waist, a flared A-line hem, inseam pockets, modified raglan yoke sleeves, and beaded lapels with an exposed beaded zipper (see Figures 45-46 & Figure 95). These sleeves are not full raglan or full yoke sleeves, so they became a combination raglan yoke variation (see Figure 48). Also, the collar and lapel are designed as one piece, eliminating extra seam lines (see Figure 47).
This coat is made from a hemp and silk blend fabric and is intentionally monochromatic. The limited color palette paired with the silver and metallic beads and rhinestones in a linear design keeps this coat feeling crisp and clean.

Coat 3 – Raglan Lapel Coat

This coat features an embellished lapel, a front raglan sleeve, a back raglan yoke sleeve, triangular welt pockets, and a tubular silhouette (see Figures 49-50 & Figure 96). By mixing both types of sleeves in one coat, it allows the front lapel to be sewn into the seam line, anchoring the lapel into the jacket. Anchoring the lapel stops it from unnecessarily flapping around and ensures the labor intensive embellishment is always on display.

This coat is made from grey metallic wool, also used in the zip front dress, with the combination of olive crepe back silk. The stitched rouleau on the lapel is all hand done, and the negative space created between the strips is further contrasted by the matte black underneath the olive green strips (see Figure 51). This effect is a play on satin lapels found in formalwear, creating a modern variation. The triangular welt pocket is a modification of a traditional welt pocket or bound buttonhole, which adds an unexpected design detail that parallels the triangular shape of the lapel (see Figure 52).

Gown 1 – Bandeau Halter Gown

This gown features an embellished bandeau bodice that holds up the entire skirt, creating an open back and side detail (see Figure 53 & Figure 97). This design is based on one point of tension, since the halter neck tie and skirt front are held together at one point on the body. The skirt has a slit at center front, which creates movement in the skirt for the
wearer as she walks (see Figure 54). The body of the gown is not overly fitted, which obscures part of the body while simultaneously exposing the wearer's back and legs.

The bandeau bodice surface is covered in swirling rows of stitched rouleau, made from olive crepe back silk (see Figure 55). This rouleau follows the contours of the bodice and mirrors the pleated lines found in the front of the gown. The body of the gown is made from white hemp and silk blend fabric, which is lightweight, yet strong. By cutting the gown on the bias grain, the fabric will skim the body better than the traditional grain, and create softer folds at the front. Also, by cutting on the bias, the textured slubs in the fabric follow the body in a diagonal line, from the front to the back.

Gown 2 – Cowl Halter Gown

This gown features an asymmetric cowl front, open back, side slit, and separate glove sleeves that appear to be attached to the gown (see Figures 56-58). This design is based on two points of tension, since a cowl is held up by two separate points. In this case, the body of the gown is attached to the halter band that wraps around the neck and back. This band supports the weight of the remaining fabric, without looking bulky.

This gown is made from black silk jersey and the custom digital printed silk jersey with the pearl motif. By pairing the print with a solid black, it allows the print and sleeves to remain in focus. The glove sleeves are the same fabric as the halter band, which gives the illusion that the gown and sleeves are attached. However, the glove sleeves are separate, allowing more styling options for the wearer (see Figure 98). A second version was made of this design in which the black and print are reversed to compare the overall effect and create two very different styles from the same fabrics and pattern (see Figure 99).
Gown 3 – Bias Cut T-Back Halter Gown

This gown is cut on the bias, has a sweetheart neckline, a T-back, and a small train at the back hem (see Figure 60 & Figure 100). Diagonal seam lines follow the body from the front to the back, adding visual interest and an opportunity to flip the face of the fabric (see Figure 61). This gown is based on three points of tension, two from the front bodice, and one from the back. Creating this type of T-back, instead of a low or open back, to the gown adds a modern and sporty touch to a classic silhouette (see Figure 59).

This gown is made from olive colored silk crepe back satin and using both the shiny and matte sides of this textile in one look really makes it a stand out piece. Combining both faces really showcases the seam lines and helps to elongate the body. By cutting the gown on true bias, it molds to the wearer’s body like a second skin, in ways it cannot do if it was cut on the straight of grain.
CHAPTER V

DISCUSSION

Dress 1 – Princess Kimono Gusset Dress

This design is both additive and subtractive from a structural standpoint. By both adding a grown on gusset and subtracting part of the shoulder seam, a new version of the princess kimono armhole was created. The grown on gusset is different than a traditional gusset, in that it is cut as one piece with part of the sleeve. Traditionally, a gusset is a small piece of fabric sewn to other parts of the sleeve, but with this version, there is less sewing and bulk under the arm. This modified armhole increases movement for the wearer, more than traditional armholes and sleeves allow. Also, the added fullness in the back of the skirt and lack of fullness in the front of the skirt is another example of adding and subtracting. Because of these significant structural changes, the surface was left simple to not distract from the structure of the design.

In terms of surface and structure, this design was analyzed through the two design frameworks that guide this study; the Stumbo Surface and Structure Scale and the Stumbo Surface and Structure Style Summary. On the Stumbo Surface and Structure Scale, this dress is an example of structure emphasized design (see Figure 71). On the Stumbo Surface and Structure Style Summary, this dress is characteristic of Style C: simple surface and complex structure (see Figure 72).

A comparison of this new armhole variation with a standard set in sleeve reveals the increased amount of arm movement for the wearer (see Figures 89-90). This type of
armhole provides more comfort and movement for the wearer without sacrificing aesthetics. In addition, the amount of rise in the garment is significantly decreased, providing more security for the wearer, since she is able to move freely without concern of the hemline of the dress rising too high and exposing too much of the upper leg.

In terms of production information, fabric and materials make up the majority of costs for this design (see Figure 62 & Table 3). The princess kimono armhole requires more fabric than other types of armholes and sleeves, which will increase the final retail price. If a seam was added to the center front, the amount of fabric used could be reduced; however, the addition of this seam would detract from the aesthetics of the piece. In this case, the aesthetics drove this production decision, and the higher price point supports this.

**Dress 2 – Zip Front Sleeve Yoke Dress**

This design is subtractive because part of the sleeve is removed and the front bodice is extended to take its place. This causes the finished sleeve to push slightly away from the body of the dress. This modification was designed to contradict the assumption that the arms are always perfectly down by one’s side. In reality, the arms are usually up or away from the body to some degree, so the pattern was created with this in mind. This type of yoke sleeve better matches the natural posture of the body and allows increased range of motion for the wearer, though not as much as the first dress. In the skirt, the original princess seam lines were removed and replaced with darts; this simplified the bottom of the dress to give more interest to the top bodice. Also, both faces of the fabric are used, removing metallic shine from the garment surface.
In terms of surface and structure, this design was analyzed through the two design frameworks that guide this study; the *Stumpo Surface and Structure Scale* and the *Stumpo Surface and Structure Style Summary*. On the *Stumpo Surface and Structure Scale*, this dress is an example of structure emphasized design (see Figure 73). On the *Stumpo Surface and Structure Style Summary*, this dress is characteristic of Style C: simple surface and complex structure (see Figure 74).

A comparison of this dropped yoke sleeve with a standard set in sleeve reveals the increased amount of movement for the wearer (see Figures 91-92). This type of armhole provides more movement for the wearer without sacrificing aesthetics, though not as much movement as the princess kimono gusset sleeve. In addition, the amount of rise in the garment is decreased, providing more security for the wearer, since she is able to move freely without concern of the hemline of the dress rising too high and exposing too much of the upper leg.

In terms of production information, material and labor costs were almost equal for this design, with labor costs being slightly higher (see Figure 63 & Table 4). This type of modified yoke sleeve did not notably increase the amount of fabric or sewing time, making this type of design more easily produce-able. Matching the numerous style lines took the most effort within this design.

**Dress 3 – One Shoulder Knit Dress**

This design is additive because the image of pearls is added to the surface of the silk jersey through the digital printing process. Also, value and exclusivity are added to this design, since it is a custom, one-of-a-kind fabric that no one else has. In addition, this
specific type of digital printing added awareness to this design process, by taking what is usually the least sustainable part of the process, and making it the most sustainable.

In terms of surface and structure, this design was analyzed through the two design frameworks that guide this study; the *Stumpo Surface and Structure Scale* and the *Stumpo Surface and Structure Style Summary*. On the *Stumpo Surface and Structure Scale*, this dress is an example of equally emphasized surface and structure design (see Figure 75). On the *Stumpo Surface and Structure Style Summary*, this dress is characteristic of Style D: simple surface and simple structure (see Figure 76).

In terms of production information, fabric and materials make up the majority of costs for this design (see Figure 64 & Table 5). Material cost makes up almost 75% of overall cost because this design uses the custom digital print silk jersey and takes the least amount of time and labor to create. By using a knit fabric, the construction process is streamlined since fewer steps are necessary as compared to a woven garment.

**Coat 1 – Opera Coat**

This design is both additive and subtractive in terms of structure and surface. The large amount of added volume to this coat adds a touch of drama and luxury. Looking at the pocket, the top edge of the pocket is added on to the center front of the coat, which would normally be cut separately in mass production. Adding this piece to the front of the coat increases the complexity of construction and price point of production. The rows of parallel channel stitching on the pocket itself add a subtle designer detail to the coat, without distracting from the overall design. By using the back side of the fabric in the back pleat and on the front pocket, the subtraction of the metallic gold really makes the unusual
construction of the pocket stand out. The collar on this coat is an extension of the sleeve, made by subtracting traditional seam lines and adding on to the sleeve to create a modern variation of a funnel collar.

In terms of surface and structure, this design was analyzed through the two design frameworks that guide this study; the Stumpo Surface and Structure Scale and the Stumpo Surface and Structure Style Summary. On the Stumpo Surface and Structure Scale, this dress is an example of structure emphasized design (see Figure 77). On the Stumpo Surface and Structure Style Summary, this dress is characteristic of Style C: simple surface and complex structure (see Figure 78).

In terms of production information, fabric and materials make up the majority of costs for this design (see Figure 65 & Table 6). Because this coat is floor length, this represents the higher end of possible fabric costs. If the length is shortened, the fabric costs will decrease accordingly. The channel stitching embellishment adds a designer touch without dramatically increasing production cost.

Coat 2 – Empire Waist Coat

In this design, both structure and surface feature additive elements. This design is additive because the front, collar, and lapel are added together to form one piece, creating an unusual variation of a shawl collar. The coat lapel features linear beading, which add texture and interest to the surface of the textile. In addition, the exposed zipper, which is mostly functional in nature, was embellished, adding hard contrast and shine to the monochromatic white of the coat. The modified raglan yoke sleeve combined two types of
sleeves into one new version, which requires higher level of production skill to successfully create.

In terms of surface and structure, this design was analyzed through the two design frameworks that guide this study; the Stumpo Surface and Structure Scale and the Stumpo Surface and Structure Style Summary. On the Stumpo Surface and Structure Scale, this dress is an example of equally emphasized surface and structure design (see Figure 79). On the Stumpo Surface and Structure Style Summary, this dress is characteristic of Style C: simple surface and complex structure (see Figure 80).

In terms of production information, labor costs make up about half of total costs for this design (see Figure 66 & Table 7). Material and embellishment costs make up the remaining total costs, though the embellishment cost is higher than other designs due to the labor-intensive nature of beaded embellishment. Extending the beading onto the zipper is unusual, but it adds value to the zipper and makes it a focal point which justifies the higher cost of the zipper itself.

Coat 3 – Raglan Lapel Coat

This design is subtractive because of the negative space created on the surface of the lapel and the intentionally limited number of seams. By removing unnecessary seams, the detail work in the lapel and pocket stands out and is prominently featured. The hand stitched floating rouleau has a greater impact because of the negative space between the strips of olive silk. By using a dull black silk behind the shiny olive silk strips, the negative space is further highlighted. This lapel is a play on the traditional satin lapel, often found in
formal coats and jackets, though it is more interesting due to the negative space between
the rouleau strips.

In terms of surface and structure, this design was analyzed through the two design
frameworks that guide this study; the *Stumpo Surface and Structure Scale* and the *Stumpo
Surface and Structure Style Summary*. On the *Stumpo Surface and Structure Scale*, this dress
is an example of surface emphasized design (see Figure 81). On the *Stumpo Surface and
Structure Style Summary*, this dress is characteristic of Style B: complex surface and simple
structure (see Figure 82).

In terms of production information, labor and material costs are almost exactly
equal for this design (see Figure 67 & Table 8). The embellishment cost is noteworthy, but
is reasonable because the hand stitched rouleau is used exclusively on the jacket lapel.
Doing the entire coat in this technique would create a stunning piece but would fall into the
couture category since the cost of a completely handmade coat would be extremely high.

**Gown 1 – Bandeau Halter Gown**

This design is additive because the layers of rouleau strips add texture and
dimension to the bandeau bodice of the gown. This is a time intensive and complex
technique, which falls into contrast with the simplicity of the skirt of the gown. By adding
these strips in a swirling, contoured manner, it also adds visual interest and follows the
natural form of the bodice. Also, by adding soft pleats to the front of the gown, the shape of
the body is slightly hidden, adding emphasis to the back and legs which are more exposed.

In terms of surface and structure, this design was analyzed through the two design
frameworks that guide this study; the *Stumpo Surface and Structure Scale* and the *Stumpo
Surface and Structure Style Summary. On the Stumpo Surface and Structure Scale, this dress is an example of equally emphasized surface and structure design (see Figure 83). On the Stumpo Surface and Structure Style Summary, this dress is characteristic of Style B: complex surface and simple structure (see Figure 84).

In terms of production information, fabric and material costs are almost exactly half of total costs for this design (see Figure 68 & Table 9). The embellishment cost is noteworthy, but is reasonable because the hand stitched rouleau is used exclusively on the bandeau bodice. Covering the entire gown in this technique would create a stunning piece but would fall into the couture category since the cost of a completely handmade gown would be extremely high, higher than the designer level price point of the collection.

Gown 2 – Cowl Halter Gown

This design is both additive and subtractive in terms of structure and surface. By utilizing the custom digital pearl print, the pearl motif is added to the surface of the textile. Even though the glove sleeves are separate from the gown, they look like they are attached because the halter band is cut in the same fabric, so they blend together. This hidden separation adds more styling options for the wearer, since the sleeves can be easily added or removed. Also, by eliminating the seams between a pair of gloves and a sleeve, a novel variation on opera length gloves adds a special detail that is possible at a higher level of production and price point.

In terms of surface and structure, this design was analyzed through the two design frameworks that guide this study; the Stumpo Surface and Structure Scale and the Stumpo Surface and Structure Style Summary. On the Stumpo Surface and Structure Scale, this dress
is an example of structure emphasized design (see Figure 85). On the *Stumpo Surface and Structure Style Summary*, this dress is characteristic of Style D: simple surface and simple structure (see Figure 86).

In terms of production information, fabric and materials make up the majority of costs for this design (see Figure 69 & Table 10). Material cost make up almost 73% of overall cost because this design uses silk jersey, which has the second highest per yard cost. By using a knit fabric, the construction process is streamlined since fewer steps are necessary as compared to a woven garment. Making a second gown with the opposite fabric combination adds significant cost but creates an interesting pairing and shows how one design looks in two very different styles.

Gown 3 – Bias Cut T-Back Halter Gown

This design is subtractive because the body of the gown is split up into panels, allowing the fabric faces to be switched around. This switching of faces allows for strategic removal of the high shine and luster that crepe back silk is known for. This contrast emphasizes the diagonal style lines across the body, especially the T-back neckline, which is an unusual and sporty touch to a more traditional style gown.

In terms of surface and structure, this design was analyzed through the two design frameworks that guide this study; the *Stumpo Surface and Structure Scale* and the *Stumpo Surface and Structure Style Summary*. On the *Stumpo Surface and Structure Scale*, this dress is an example of structure emphasized design (see Figure 87). On the *Stumpo Surface and Structure Style Summary*, this dress is characteristic of Style C: simple surface and complex structure (see Figure 88).
Usually, long bias gowns need small patches of fabric added on to the bottom to reach floor length. This is because the fixed width of the fabric dictates the diagonal length of the bias. If the garment piece is longer than the bias length, fabric must be added on to cut to create a full piece. Since the gown was split into multiple pieces, less fabric was wasted during cutting and any of these types of unintended seams were completely eliminated.

In terms of production information, fabric and material costs are slightly greater than labor costs for this design, but they are almost equal (see Figure 70 & Table 11). Since this gown is bias cut, it requires more time, care, and material than other pieces. Bias garments are generally unlined, reducing time and materials costs. Flipping the faces of the fabric adds visual interest and texture without adding additional embellishment costs, which makes this design more feasible to produce.

**Overall Collection**

This collection gave me the opportunity to look at the design process in a new light and forced me to design within a given set of parameters, which is a good exercise for all designers. The mix of fabrics, textures, details, and complex construction is representative of a more sophisticated level of design than my past work. In particular the harmony in the color palette makes the variety of textures stand out. While I have sampled and created these embellishment techniques for other designers, this was the first time they are actually put into a final garment for my own use. Restricting the embellishment to variations of lines, pearls, and circles stays away from potential clichéd prints and puts the structural details on prominent display.
Limitations

One important thing to note about this collection is that it was made completely by me, as a single designer, without access to wholesale supplies. This means that my costs of production were higher than they would be if I was an actual company, placing orders for large amounts of fabric. Most suppliers have 20 or 50 meter minimums, which is significantly more than I would be able to use in this collection. I was able to find suitable materials to use in this collection, but it was difficult to locate some of them. In particular, cotton bobbinet and digital print silk jersey were the hardest to find and most expensive to purchase out of all the supplies.

Since I did all designing, patternmaking, cutting, sewing, and embellishments on my own, it took longer than it would if I had some assistance. This forced me to be strategic with embellishment because making pieces that were fully beaded or pleated would have taken more time than I had available. I had to strike a balance between what I desired to create and what was physically possible for me to create within the thesis timeframe.

Sustainability

While this collection is not completely sustainable or zero waste, I made a conscious effort to be strategic and eliminate waste as much as possible. Most of my scraps were used as embellishments, so not very much fabric was wasted. For example scraps from cutting the bias gown, which are notorious for wasting fabric, became bias strips which I could use in embellishments for other designs such as the grey coat or white gown. Also, the digital print was printed from a Kornit© Allegro printer, which uses non-toxic and biodegradable
inks, and has no pre or post print processing. This eliminates the need to use water and harmful chemicals, which saves time, money, and pollution.

These garments are also made with more hand finished details than most garments available on the market today and are not fully linked to any one season. Each design has deliberate aesthetic and structural choices, as compared to my past work, which led to the exploration of embellishment techniques and alternative armhole and sleeve combinations. Compared to my past work these designs are more in line with the slow fashion movement and have an increased sense of sustainable production practices. Instead of becoming discarded after a few short weeks when the next trend comes off the perpetual fashion cycle, these designs are made to last and can be enjoyed over a long period of time because they are not linked to specific trends.

What was successful?

Having to work and design within such specific parameters was a great design challenge for me at this pivotal point in my design career. Some days it was more challenging than others, but overall it made me think and be strategic about why I was designing what I was designing. I also was able to identify my own internal framework of design, which I did not realize I used until I began this process. I think the collection is successful and shows a different approach than what is taught in school; not every collection has deep metaphorical meaning and photo collages to guide it. I am a technique-driven designer, and would rather spend time crafting a fashion story through embellishment and patternmaking, than in making mood boards. I hope my approach can
help guide other creative people and contribute to conversation around different methods of design and creativity.

What was challenging?

The biggest challenge was staying within the framework I setup. As I would sketch and design, I would think up new ideas that I wanted to pursue, but did not at all relate to the research topic. Since I like to design for big visual impact it was a challenge to be strategic with embellishment. I had to realize that doing fully embroidered gowns or yards of hand pleating were unrealistic within this thesis time frame.

It was also difficult to analyze design in terms of additive and subtractive because there are many more additive techniques than there are subtractive ones. Some techniques were repeated but the overall effects in the individual pieces are different. Some techniques could be counted as both, which complicated matters. For example, is pleating considered additive because it takes more fabric? Or is it subtractive, because part of the visible textile surface is removed from view to form the pleat structure?

It was also challenging to make this size collection on my own, when normally there would be a small team working on this scale. Having to be my own designer, patternmaker, sample sewer, sourcing agent, and production manager was difficult, but strengthened my skills in each area overall. Even with a small team in the fashion industry, small scale production can be challenging and requires full participation from all team members. This study was a good reinforcement of this, since I have worked with small and large teams during my past internship experiences and seen firsthand how smaller teams usually means more responsibility for each individual member of the team.
What did I learn?

Through the creation of this collection, I learned a lot about myself as a designer. This collection is a departure from my past aesthetic and techniques, and truly reflects my desire to constantly learn and improve. While in the past I have made samples of some of these embellishment techniques, I had to teach myself more about all of them to get the end result I desired on a full garment. I also realized design is a combination of surface and structure, and that I enjoy using both to varying degrees. While my background is in surface design embellishments, I was able to use this collection to improve and explore alternative structural elements as well which was a good test of my patternmaking abilities. The interaction between the sleeve and armhole has always been of interest and importance to me, and I was able to use this collection to improve fit and functionality of my work, not just aesthetics.

For this collection, I also kept detailed records of all necessary production information. This includes things such as cutting time, sewing time, and yardage used, which helps show the actual cost and feasibility of producing these types of designs for sale. To consumers and companies alike, cost and aesthetics are both extremely important and all designers need to understand the limitations of both. After this experience, I feel more confident in my ability to see the effects of what I design in a production context within the apparel industry.

Future Areas of Study

For future study, I would consider changing terms of additive and subtractive design, or changing the parameters in some way. Because there are more additive than
subtractive elements, it was a challenge to not be too repetitive. Also, technically speaking, almost everything is both additive and subtractive, which is why I limited this study to the direct effect on the textile, namely if it adds or removes something. Focusing on surface and structure instead of additive and subtractive may allow more creative options and lead to a wider variety of interpretations.

In an apparel context, this framework could be useful to help show students different approaches to designing a collection. Some designers are story based, while others are technique based but, in the end, there is no singular method to design. I think it is important for students to take a step back and look at the big picture while in school, and that professors can help emphasize that what they learn from the textbook may not follow actual practices of the apparel industry. Identifying and closing the gap between academia and industry would benefit both areas, since students would feel more prepared for life outside the ivory tower, and the industry would have more graduates with relevant information and skill sets.

This type of framework could also be adapted to other areas of study, including various artistic mediums. As any person in a creating and making capacity, breaking down how your process affects your finished project can help improve efficiency and deliberateness of the work. Until things are written out on paper, we may think they look one way, but sometimes there is a discrepancy between what we think happens and what is actually happening.
APPENDIX A

SAMPLES & FITTINGS
Figure 21. First sample review on 1.27.16, 3 looks

Figure 22. Second sample review on 2.2.16, 8 looks
Figure 23. Third sample review on 2.16.16, 3 looks adjusted

Figure 24. Fourth sample review on 2.24.16, all 9 looks adjusted
Figure 25. G1 initial drape, ready for conversion into paper pattern

Figure 26. G1 sample 1 front view, cut from first paper pattern

Figure 27. G1 sample 1 back view

Figure 28. G1 sample 1 side view, Skirt fullness adjusted
Figure 29. G1 sample 2 back view, cut from adjusted pattern

Figure 30. G1 sample 2 front view

Figure 31. G1 sample 2 side view
APPENDIX B

COLLECTION PHOTOGRAPHS
Figure 32. Dress 1 back view

Figure 33. Dress 1 front view

Figure 34. Dress 1 sleeve detail

Figure 35. Dress 1 custom grown-on sleeve gusset
Figure 39. Dress 3 back view

Figure 40. Dress 3 front view

Figure 41. Dress 3 neckline detail
Figure 42. Coat 1 back view

Figure 43. Coat 1 front view

Figure 44. Coat 1 pocket detail
Figure 45. Coat 2 back view
Figure 46. Coat 2 front view
Figure 47. Coat 2 neckline detail
Figure 48. Coat 2 sleeve detail
Figure 53. Gown 1 back view

Figure 54. Gown 1 front view

Figure 55. Gown 1 bodice detail
Figure 56. Gown 2 back view

Figure 57. Gown 2 front view, With glove sleeves

Figure 58. Gown 2 bodice detail, glove sleeves removed
Figure 59. Gown 3 back view

Figure 60. Gown 3 front view

Figure 61. Gown 3 side detail
APPENDIX C

COSTING
The cost of Dress 1 is detailed below:

<table>
<thead>
<tr>
<th>Material</th>
<th>Yardage</th>
<th>Rate</th>
<th>Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SELF</td>
<td>5 yds 18&quot; @ $31.50/yd</td>
<td>$173.25</td>
<td></td>
</tr>
<tr>
<td>FUSE</td>
<td>18&quot; @ $5.29/yd</td>
<td>$2.65</td>
<td></td>
</tr>
<tr>
<td>Lining</td>
<td>3.25 yds @ $4.99/yd</td>
<td>$16.22</td>
<td></td>
</tr>
<tr>
<td>Closure</td>
<td>Zipper 22&quot; invisible</td>
<td>$2.10</td>
<td></td>
</tr>
<tr>
<td>Hook &amp; eye</td>
<td>1 set</td>
<td>$0.18</td>
<td></td>
</tr>
<tr>
<td>Thread</td>
<td>1 spool all-purpose</td>
<td>$1.79</td>
<td></td>
</tr>
<tr>
<td>Cutting</td>
<td>3 hrs $12.91/hr</td>
<td>$38.73</td>
<td></td>
</tr>
<tr>
<td>Sewing</td>
<td>4 hrs $10.55/hr</td>
<td>$42.20</td>
<td></td>
</tr>
<tr>
<td>Finishing</td>
<td>4 hrs $10.89/hr</td>
<td>$43.56</td>
<td></td>
</tr>
<tr>
<td>Lining Cutting</td>
<td>0.5 hrs $12.91/hr</td>
<td>$6.46</td>
<td></td>
</tr>
<tr>
<td>Lining Sewing</td>
<td>2 hrs $10.55/hr</td>
<td>$21.10</td>
<td></td>
</tr>
<tr>
<td>Embellish</td>
<td>0 $14.68/hr</td>
<td>$0.00</td>
<td></td>
</tr>
</tbody>
</table>

**Material Cost**: $196.18

**Labor Cost**: $152.05

**Total Cost**: $348.23

![Dress 1 - Princess Kimono Dress](image)

**Figure 62. Dress 1 cost graph**

**Table 3. Dress 1 cost detail**
Figure 63. Dress 2 cost graph

<table>
<thead>
<tr>
<th></th>
<th>D2 - Zip Front Dress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yardage</td>
<td>SELF 2 yds 11&quot; @ $22.50</td>
</tr>
<tr>
<td></td>
<td>FUSE 14&quot; @ $5.29/yd</td>
</tr>
<tr>
<td></td>
<td>Lining 1.5 yds @ $4.99/yd</td>
</tr>
<tr>
<td>Closure</td>
<td>Zipper 18&quot; metal M4</td>
</tr>
<tr>
<td>Thread</td>
<td>1 spool all-purpose</td>
</tr>
<tr>
<td>Cutting</td>
<td>1 hr $12.91/hr</td>
</tr>
<tr>
<td>Sewing</td>
<td>6.5 hrs $10.55/hr</td>
</tr>
<tr>
<td>Finishing</td>
<td>1 hr $10.89/hr</td>
</tr>
<tr>
<td>Lining Cutting</td>
<td>0.5 hr $12.91/hr</td>
</tr>
<tr>
<td>Lining Sewing</td>
<td>2 hrs $10.55/hr</td>
</tr>
<tr>
<td>Embellish</td>
<td>0 $14.68/hr</td>
</tr>
<tr>
<td>Material Cost</td>
<td></td>
</tr>
<tr>
<td>Labor Cost</td>
<td></td>
</tr>
<tr>
<td>Total Cost</td>
<td></td>
</tr>
</tbody>
</table>

Table 4. Dress 2 cost detail
Figure 64. Dress 3 cost graph

<table>
<thead>
<tr>
<th></th>
<th>Yardage</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SELF</td>
<td>40&quot; @ $95</td>
<td>$105.56</td>
<td></td>
</tr>
<tr>
<td>Lining</td>
<td>40&quot; @ $8.99/yd</td>
<td>$9.99</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thread</td>
<td>1 spool</td>
<td>all-purpose</td>
<td>$1.79</td>
<td></td>
</tr>
<tr>
<td>Cutting</td>
<td>11 mins</td>
<td>$12.91/hr</td>
<td>$2.37</td>
<td></td>
</tr>
<tr>
<td>Sewing</td>
<td>30 mins</td>
<td>$10.55/hr</td>
<td>$5.28</td>
<td></td>
</tr>
<tr>
<td>Finishing</td>
<td>2 hrs</td>
<td>$10.89/hr</td>
<td>$21.78</td>
<td></td>
</tr>
<tr>
<td>Lining Cutting</td>
<td>30 mins</td>
<td>$12.91/hr</td>
<td>$6.46</td>
<td></td>
</tr>
<tr>
<td>Lining Sewing</td>
<td>30 mins</td>
<td>$10.55/hr</td>
<td>$5.28</td>
<td></td>
</tr>
<tr>
<td>Embellish</td>
<td></td>
<td>$14.68/hr</td>
<td>$0.00</td>
<td></td>
</tr>
<tr>
<td>Material Cost</td>
<td></td>
<td></td>
<td>$119.70</td>
<td></td>
</tr>
<tr>
<td>Labor Cost</td>
<td></td>
<td></td>
<td>$38.79</td>
<td></td>
</tr>
<tr>
<td>Total Cost</td>
<td></td>
<td></td>
<td>$158.49</td>
<td></td>
</tr>
</tbody>
</table>

Table 5. Dress 3 cost detail
Figure 65. Coat 1 cost graph

<table>
<thead>
<tr>
<th>C1 - Opera Coat</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yardage</td>
<td>SELF</td>
<td>160&quot; @ $31.50/yd</td>
<td>$140.00</td>
</tr>
<tr>
<td></td>
<td>FUSE</td>
<td>5 yds @ $5.29/yd</td>
<td>$26.45</td>
</tr>
<tr>
<td></td>
<td>Lining</td>
<td>3 yds @ $4.99/yd</td>
<td>$14.97</td>
</tr>
<tr>
<td>Thread</td>
<td>1 spool</td>
<td>all-purpose</td>
<td>$1.79</td>
</tr>
<tr>
<td>Cutting</td>
<td>3 hrs</td>
<td>$12.91/hr</td>
<td>$38.73</td>
</tr>
<tr>
<td>Sewing</td>
<td>4 hrs</td>
<td>$10.55/hr</td>
<td>$42.20</td>
</tr>
<tr>
<td>Finishing</td>
<td>4 hrs</td>
<td>$10.89/hr</td>
<td>$43.56</td>
</tr>
<tr>
<td>Lining Cutting</td>
<td>0.5 hrs</td>
<td>$12.91/hr</td>
<td>$6.46</td>
</tr>
<tr>
<td>Lining Sewing</td>
<td>2 hrs</td>
<td>$10.55/hr</td>
<td>$21.10</td>
</tr>
<tr>
<td>Embellish</td>
<td>.5 hrs</td>
<td>$14.68/hr</td>
<td>$7.34</td>
</tr>
<tr>
<td>Material Cost</td>
<td></td>
<td></td>
<td>$183.21</td>
</tr>
<tr>
<td>Labor Cost</td>
<td></td>
<td></td>
<td>$159.39</td>
</tr>
<tr>
<td>Total Cost</td>
<td></td>
<td></td>
<td>$342.60</td>
</tr>
</tbody>
</table>

Table 6. Coat 1 cost detail
Figure 66. Coat 2 cost graph

<table>
<thead>
<tr>
<th>C2 - Empire Waist Coat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yardage</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Closure</td>
</tr>
<tr>
<td>Thread</td>
</tr>
<tr>
<td>Beads</td>
</tr>
<tr>
<td>Cutting</td>
</tr>
<tr>
<td>Sewing</td>
</tr>
<tr>
<td>Finishing</td>
</tr>
<tr>
<td>Lining Cutting</td>
</tr>
<tr>
<td>Lining Sewing</td>
</tr>
<tr>
<td>Embellish</td>
</tr>
<tr>
<td>Material Cost</td>
</tr>
<tr>
<td>Labor Cost</td>
</tr>
<tr>
<td>Total Cost</td>
</tr>
</tbody>
</table>

Table 7. Coat 2 cost detail
C3 - Raglan Yoke Lapel Coat

<table>
<thead>
<tr>
<th>Yardage</th>
<th>SELF</th>
<th>3 yds @ $22.50</th>
<th>$67.50</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUSE</td>
<td>7.5 @ $5.29/yd</td>
<td></td>
<td>$39.68</td>
</tr>
<tr>
<td>COMBO 1</td>
<td>15&quot;x9&quot;</td>
<td></td>
<td>$9.38</td>
</tr>
<tr>
<td>COMBO 2</td>
<td>0.5 yds @ $22.50/yd</td>
<td></td>
<td>$11.25</td>
</tr>
<tr>
<td>Lining</td>
<td>2 yds @ $4.99/yd</td>
<td></td>
<td>$9.98</td>
</tr>
<tr>
<td>Thread</td>
<td>2 spools</td>
<td>all-purpose</td>
<td>$3.58</td>
</tr>
<tr>
<td>Cutting</td>
<td>0.5 hrs</td>
<td>$12.91/hr</td>
<td>$6.46</td>
</tr>
<tr>
<td>Sewing</td>
<td>3 hrs</td>
<td>$10.55/hr</td>
<td>$31.65</td>
</tr>
<tr>
<td>Finishing</td>
<td>1.5 hrs</td>
<td>$10.89/hr</td>
<td>$16.34</td>
</tr>
<tr>
<td>Lining Cutting</td>
<td>0.5 hr</td>
<td>$12.91/hr</td>
<td>$6.46</td>
</tr>
<tr>
<td>Lining Sewing</td>
<td>2 hrs</td>
<td>$10.55/hr</td>
<td>$21.10</td>
</tr>
<tr>
<td>Embellish</td>
<td>6 hrs</td>
<td>floating rouleau @ $14.68/hr</td>
<td>$88.08</td>
</tr>
<tr>
<td>Material Cost</td>
<td></td>
<td></td>
<td>$141.36</td>
</tr>
<tr>
<td>Labor Cost</td>
<td></td>
<td></td>
<td>$170.08</td>
</tr>
<tr>
<td>Total Cost</td>
<td></td>
<td></td>
<td>$311.44</td>
</tr>
</tbody>
</table>

Table 8. Coat 3 cost detail
Figure 68. Gown 1 cost graph

<table>
<thead>
<tr>
<th>Material</th>
<th>Description</th>
<th>Yardage</th>
<th>Unit Price</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>SELF</td>
<td>5 yds @ $22.37/yd</td>
<td></td>
<td>$111.85</td>
<td></td>
</tr>
<tr>
<td>FUSE</td>
<td>10&quot; @ $5.29/yd</td>
<td></td>
<td>$1.47</td>
<td></td>
</tr>
<tr>
<td>COMBO 1</td>
<td>10&quot; Net @ $39.99/yd</td>
<td></td>
<td>$11.11</td>
<td></td>
</tr>
<tr>
<td>COMBO 2</td>
<td>1.5&quot;x164&quot; CBS</td>
<td></td>
<td>$3.13</td>
<td></td>
</tr>
<tr>
<td>Lining</td>
<td>3.5 yds silk gauze @ $22.50/yd</td>
<td></td>
<td>$78.75</td>
<td></td>
</tr>
<tr>
<td>Grosgrain</td>
<td>15.5&quot; @ $1.59/yd</td>
<td></td>
<td>$0.68</td>
<td></td>
</tr>
<tr>
<td>Boning</td>
<td>15.5&quot; @ $3.18/yd</td>
<td></td>
<td>$1.37</td>
<td></td>
</tr>
<tr>
<td>Cups</td>
<td>2</td>
<td></td>
<td>$10.00</td>
<td></td>
</tr>
<tr>
<td>Closure</td>
<td>Hook &amp; eye 1 set - adjustable</td>
<td></td>
<td>$1.00</td>
<td></td>
</tr>
<tr>
<td>Thread</td>
<td>2 spools all-purpose</td>
<td></td>
<td>$3.58</td>
<td></td>
</tr>
<tr>
<td>Cutting</td>
<td>2 hrs</td>
<td></td>
<td>$12.91/hr</td>
<td></td>
</tr>
<tr>
<td>Sewing</td>
<td>1 hr</td>
<td></td>
<td>$10.55/hr</td>
<td></td>
</tr>
<tr>
<td>Finishing</td>
<td>2 hrs</td>
<td></td>
<td>$10.89/hr</td>
<td></td>
</tr>
<tr>
<td>Lining Cutting</td>
<td>1 hrs</td>
<td></td>
<td>$12.91/hr</td>
<td></td>
</tr>
<tr>
<td>Lining Sewing</td>
<td>1 hr</td>
<td></td>
<td>$10.55/hr</td>
<td></td>
</tr>
<tr>
<td>Embellish</td>
<td>5 hrs rouleau @ $14.68/hr</td>
<td></td>
<td>$73.40</td>
<td></td>
</tr>
<tr>
<td>Material Cost</td>
<td></td>
<td></td>
<td>$222.94</td>
<td></td>
</tr>
<tr>
<td>Labor Cost</td>
<td></td>
<td></td>
<td>$155.01</td>
<td></td>
</tr>
<tr>
<td>Total Cost</td>
<td></td>
<td></td>
<td>$377.95</td>
<td></td>
</tr>
</tbody>
</table>

Table 9. Gown 1 cost detail
Figure 69. Gown 2 cost graph

<table>
<thead>
<tr>
<th>Material/Operation</th>
<th>Description</th>
<th>Cost Breakdown</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Yardage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SELF</td>
<td>6 yds @ $42.50/yd</td>
<td>$255.00</td>
</tr>
<tr>
<td>FUSE</td>
<td>18&quot; @ $5.29/yd</td>
<td>$2.65</td>
</tr>
<tr>
<td>COMBO</td>
<td>1 yd @ $95/yd</td>
<td>$95.00</td>
</tr>
<tr>
<td><strong>Closure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hook &amp; eye</td>
<td>1 set - adjustable</td>
<td>$1.00</td>
</tr>
<tr>
<td><strong>Thread</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 spool</td>
<td>all-purpose</td>
<td>$1.79</td>
</tr>
<tr>
<td><strong>Cutting</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 hrs</td>
<td></td>
<td>$38.73</td>
</tr>
<tr>
<td><strong>Sewing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 hrs</td>
<td></td>
<td>$42.20</td>
</tr>
<tr>
<td><strong>Finishing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5 hrs</td>
<td></td>
<td>$27.23</td>
</tr>
<tr>
<td><strong>Lining Cutting</strong></td>
<td>1 hrs</td>
<td>$12.91</td>
</tr>
<tr>
<td><strong>Lining Sewing</strong></td>
<td>1.5 hr</td>
<td>$15.83</td>
</tr>
<tr>
<td><strong>Embellish</strong></td>
<td>2 hrs gloves @ $14.68/hr</td>
<td>$29.36</td>
</tr>
<tr>
<td><strong>Material Cost</strong></td>
<td></td>
<td>$355.44</td>
</tr>
<tr>
<td><strong>Labor Cost</strong></td>
<td></td>
<td>$166.25</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td></td>
<td>$521.69</td>
</tr>
</tbody>
</table>

Table 10. Gown 2 cost detail
Figure 70. Gown 3 cost graph

<table>
<thead>
<tr>
<th>Material Cost</th>
<th>Labor Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>$101.17</td>
<td>$92.16</td>
</tr>
<tr>
<td>$193.33</td>
<td></td>
</tr>
</tbody>
</table>

Table 11. Gown 3 cost detail

<table>
<thead>
<tr>
<th>G3 - Bias T-Back Halter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yardage</td>
</tr>
<tr>
<td>Thread</td>
</tr>
<tr>
<td>Cutting</td>
</tr>
<tr>
<td>Sewing</td>
</tr>
<tr>
<td>Finishing</td>
</tr>
<tr>
<td>Embellish</td>
</tr>
<tr>
<td>Material Cost</td>
</tr>
<tr>
<td>Labor Cost</td>
</tr>
<tr>
<td>Total Cost</td>
</tr>
</tbody>
</table>
APPENDIX D

SURFACE & STRUCTURE ANALYSIS
Dress 1 – Princess Kimono Gusset Dress (Additive and Subtractive)

Figure 71. Dress 1 surface & structure scale analysis

<table>
<thead>
<tr>
<th>STRUCTURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPLEX</td>
</tr>
<tr>
<td>SIMPLE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SURFACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPLEX</td>
</tr>
<tr>
<td>STYLE A</td>
</tr>
<tr>
<td>STYLE B</td>
</tr>
</tbody>
</table>

| STYLE C   |
| STYLE D   |

Figure 72. Dress 1 surface & structure style summary analysis
Dress 2 – Zip Front Sleeve Yoke Dress (Subtractive)

Figure 73. Dress 2 surface & structure scale analysis

Figure 74. Dress 2 surface & structure style summary analysis
Figure 75. Dress 3 surface & structure scale analysis

Figure 76. Dress 3 surface & structure style summary analysis

Dress 3 – One Shoulder Knit Dress (Additive)
Coat 1 – Opera Coat (Additive and Subtractive)

Figure 77. Coat 1 surface & structure scale analysis

Figure 78. Coat 1 surface & structure style summary analysis
Coat 2 – Empire Waist Coat (Additive)

![Diagram](image)

Figure 79. Coat 2 surface & structure scale analysis

<table>
<thead>
<tr>
<th>STRUCTURE</th>
<th>COMPLEX</th>
<th>SIMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SURFACE</td>
<td>STYLE A</td>
<td>STYLE B</td>
</tr>
<tr>
<td>COMPLEX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIMPLE</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

Figure 80. Coat 2 surface & structure style summary analysis
Coat 3 – Raglan Lapel Coat (Subtractive)

Figure 81. Coat 3 surface & structure scale analysis

<table>
<thead>
<tr>
<th>SURFACE</th>
<th>STRUCTURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPLEX</td>
<td>SIMPLE</td>
</tr>
<tr>
<td>STYLE A</td>
<td>STYLE B</td>
</tr>
<tr>
<td>STYLE C</td>
<td>STYLE D</td>
</tr>
</tbody>
</table>

Figure 82. Coat 3 surface & structure style summary analysis
Gown 1 – Bandeau Halter Gown (Additive)

Figure 83. Gown 1 surface & structure scale analysis

Figure 84. Gown 1 surface & structure style summary analysis
Gown 2 – Cowl Halter Gown (Additive and Subtractive)

Figure 85. Gown 2 surface & structure scale analysis

Figure 86. Gown 2 surface & structure style summary analysis
Gown 3 – Bias Cut T-Back Halter Gown (Subtractive)

Figure 87. Gown 3 surface & structure scale analysis

Figure 88. Gown 3 surface & structure style summary analysis
APPENDIX E

MODEL PHOTOGRAPHS
Dress 1 – Princess Kimono Gusset Dress

Figure 89. Dress 1; arm movement is greatly increased with this type of sleeve, as compared to a set in sleeve

Figure 90. Dress 1; this type of sleeve follows the natural contour of the arm without sacrificing aesthetics of the dress
Dress 2 – Zip Front Sleeve Yoke Dress

Figure 91. Dress 2; drop yoke sleeve compared to a set in sleeve

Figure 92. Dress 2; arm movement is increased with this type of sleeve, as compared to a set in sleeve
Dress 3 – One Shoulder Knit Dress

Figure 93. Model wearing one shoulder knit dress

Coat 1 – Opera Coat

Figure 94. Model wearing opera coat
Coat 2 – Empire Waist Coat

Figure 95. Model wearing empire waist coat

Coat 3 – Raglan Lapel Coat

Figure 96. Model wearing raglan lapel coat
Gown 1 – Bandeau Halter Gown

Figure 97. Model wearing bandeau halter gown

Gown 2 – Cowl Halter Gown

Figure 98. Model wearing cowl halter gown, shown with and without glove sleeves
Gown 2 – Cowl Halter Gown (Second fabrication)

Figure 99. Model wearing second fabrication of cowl halter gown, shown with and without glove sleeves

Gown 3 – Bias Cut T-Back Halter Gown

Figure 100. Model wearing bias T-back halter gown
REFERENCES


