Guidelines and Application for Designing Visually Compelling Products

by

Qianyun Zhu

A thesis submitted to the Graduate Faculty of
Auburn University
in partial fulfillment of the
requirements for the Degree of
Master of Science

Auburn, Alabama
July 2, 2018

Keywords: Aesthetics, Visually Compelling Product, Product Design, Gift Design

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Approved by

Tin-Man Lau, Graduate Chair, Professor of Industrial Design
Christopher Arnold, Associate Professor of Industrial Design
Shea Tillman, Associate Professor of Industrial Design

Abstract

Today, with the development of modern civilization, the pursuit of product appearance has never ceased. However, to design a visually compelling product for the majority is a challenge for designers or companies. By studying aesthetics impression in product design, emotional design, history and case studies, this thesis will give a definition of a visually compelling product and conduct a methodology of designing a visually compelling product. In this study, it is assumed that visual focusing points (VFPs for short) are checkpoints of visually compelling products. Designers are able to design a visually compelling product by applying the VFPs to products. Finally, as an achievement, this thesis will provide a universal guideline for the design procedure.

Acknowledgments

I would like to thank my major Professor Tin-Man Lau for always supporting and encouraging me through the whole thesis writing process. Also, thanks to Professor Shea Tillman and Professor Christopher Arnold for always willing to add on new ideas or critique on this thesis. The experience I have had during the past few months will always shine in the river of my memory and has made me a better thinker and designer in the industry.

I would like to thank Beth Topping for her kindness and high-efficiency help with the logic, flow, and grammar of this thesis.

I would like to thank Fangyi Liu, Yahan Liu, and Beijia Zhang for assisting me to accomplish the photography of my final physical models.

I would like to thank Robert Capps for always kindly assisting me and giving advice on my physical models.

Finally, I would like to express my gratitude to my parents and all my friends for always being my best support.

Table of Contents

Abstract ii

Acknowledgments iii

1 INTRODUCTION 1

1.1 Problem Statement 1

1.2 Need of Study 1

1.3 Objectives of Study 2

1.4 Assumptions 2

1.5 Scope and Limits 3

1.6 Procedure and Methods 3

1.7 Anticipated Outcomes 4

2 LITERATURE REVIEW 5

2.1 Introduction 5

2.2 Aesthetic Impression in Product Design 5

2.3 Emotional Design: Why Attractive Things are Important 10

2.3.1 Introduction of Emotional Design 10

2.3.2 The Connection between Emotions and Aesthetics 13

2.4 Case Studies on Emotional Design 14

2.4.1 3.2.1 Case Study: Lemon Squeezer Designed by Philip Starck 14

2.4.2 Case Study: Design Language of the Automotive Brand MINI 19

2.5 Definition of a Visually Compelling Product 23

2.5.1 Research on Eye Tracking 23
2.6 Inspirations from Design History 24
2.6.1 Surrealism 24
2.6.2 Pop Art 27
2.6.3 Deconstructivism 30
2.6.4 Memphis Group (1981-88) 31
2.7 Conclusion 33

3 DESIGN GUIDELINES 34
3.1 Visual Focusing Points 34
3.1.1 Studies on Design Methodology: Japanese Design Company Nendo . . 34
3.2 Guidelines for Visually Compelling Product 42
3.2.1 Design Procedure 43
3.2.2 Form Does Not Have to Always Follow the Physical Function 44
3.2.3 Design Technic of Form 45
3.2.4 Material and Texture 60
3.2.5 Color Theory 63
3.2.6 Culture and Philosophy 66
3.3 Verification of the VFP checkpoints 70

4 APPLICATION OF DESIGN GUIDELINES 71
4.1 Introduction 71
4.2 Clothes Hanging Rack and Floor Lamp Redesign 71
4.2.1 Design Opportunities of Clothes Hanging Rack 71
4.2.2 Design Opportunities of Floor Lamp 73
4.3 Apply Guidelines to the Design Process 74
4.3.1 VFPs of the Clothes Hanging Rack 74

4.3.2 VFPs of the Floor Lamp 78
4.3.3 Color Variation 79
4.3.4 Photo Gallery of the Physical Models 80
4.4 Summary 87

5 CONCLUSIONS AND FURTHER DEVELOPMENT 88
5.1 Conclusion 88
5.2 Further Developments 89

References 90

List of Figures

2.1 Basic model of communication (Shannon, 1948) 6

2.2 Basic model of communication (Shannon, 1948) 6

2.3 Basic model of communication (Shannon, 1948) 8

2.4 The three teapots mentioned by Norman (Norman, 2004) 11

2.5 Three different aspects of design suggested by Norman (2004) 12

2.6 Original photograph for Juicy Salif packaging (copyright Alessi, 1987) 14

2.7 Table mat showing Philip Starcks original sketches for what was to become the Juicy Salif lemon squeezer (Lloyd & Snelders, 2003a) 15

2.8 The world under attack by aliens, La guerre des mondes (Lloyd & Snelders, 2003a) 16

2.9 A rocket from the French cartoon strip of Flash Gordon, Vol 1, 1934, (Lloyd & Snelders, 2003a) 16

2.10 Lemon squeezer in the market (from left to right, top to bottom: Amazon, n.d.; Aliexpress, n.d.; Connox, n.d.; The Giftbooth, n.d.; Crate and Barrel, n.d.; Amazon, n.d.; Designswan, n.d.; Blomus, n.d.; Briscoes, n.d.) 17

2.11 Pie chart of various materials of lemon squeezers in the market, n.d. 18

2.12 MINI Cooper Hardtop 2 Door, MINI (2018) 19

2.13 Comparison of Maslow's hierarchy of need and people's increasing products needs (Yefan, 2012) 20

2.14 Complexity of decision making when buying a car (Agco, 2014) 20

2.15 Straight lines or a curved line creates certain emotions (Kagali,2014) 21

2.16 Minor changes in MINI Cooper design creates different emotions (Kagali,2014) 21

2.17 Outside mirrors, (Seattle-MINI, 2005) 22

2.18 Eyelash for MINI (Eyelashes-For-Cars, n.d.) 22

2.19 Visual focus detected by eye tracking 24
2.20 Representative artwork of Salvador Dali and its inspired clocks 25
2.21 Design vs. Novelty 26
2.22 Representative artworks of Pop Art 28
2.23 Furniture, poster and sculpture inspired by Pop Art 29
2.24 Deconstructivism 30
2.25 Representative Memphis Group's works 31
2.26 The original 'Apple Watch', 1995 32
3.1 Nendo's projects that share the same design method, Group 1 (Nendo, 2015-2017) 36
3.2 Nendo's projects that share the same design method, Group 2 (Nendo, 2015-2017) 37
3.3 Nendo's projects that share the same design method, Group 3 (Nendo, 2015-2017) 38
3.4 The color palette of Nendo 42
3.5 Design procedure for designing a visually compelling product 43
3.6 Design technic of form 45
3.7 Design technic of form - detach 46
3.8 Design technic of form - combination of curve and straight 47
3.9 Design technic of form - detach and extrude 48
3.10 Design technic of form - fold 49
3.11 Design technic of Form - unbalanced 50
3.12 Design technic of Form - replace 51
3.13 Design technic of Form - metaphor and scale 52
3.14 Design technic of Form - misperception 53
3.15 Design technic of Form - metaphor and modularity 54
3.16 Design technic of Form - organic 55
3.17 Parametric design 56
3.18 Design technic of Form - 2D/3D transfer 57

3.19 Design technic of Form - segment 58

3.20 Design technic of Form - change with time or capacity 59

3.21 Samples of multiple material combination (adapted from Pinterest, n.d.) 62

3.22 Modern American color associations (Birren, 1950) 64

3.23 Color wheel (adapted from Pinterest, n.d.) 65

3.24 Pop Art Color scheme analyzation 65

3.25 Culture inspired design - YING YANG 67

3.26 Chinese Culture inspired design - BONSAI 67

3.27 German designer Dieter Rams's design philosophy 68

3.28 Scandinavian design 69

3.29 Verification of the VFP checkpoints in selected designs 70

4.1 Research of existing clothing hanging racks in the market (from left to right, top to bottom: Samkelham, n.d.; Orlan- press, n.d.; Allovertop, n.d.; Revista Sede Design, n.d.;) 72

4.2 Research of existing floor lamps in the market (from left to right, top to bottom: World Market, n.d.; Schoolhouse, n.d.; Target, n.d.; The Home Depot, n.d.; Target, n.d.; Blu Dot, n.d.) 73

4.3 Design process flow chart - Clothes Hanging Rack 74

4.4 VFP checkpoints of the Clothes Hanging Rack 74

4.5 A long table with everted flanges and decorated with Guaizi Pattern, Huanghuali Wood (China-Redsandal-Wood-Museum, n.d.) 75

4.6 The "horse head-shaped walls" are the typical characteristics of the Huizhou-style architecture (Huang, n.d.) 76

4.7 The combination of wood and metal 76

4.8 The combination of wood and hemp 77

4.9 Design process flow chart - Floor Lamp 78

4.10 VFP checkpoints of the Floor Lamp 78

4.11 Color variation - Chinese culture related color 79

4.12 Color variation - Pop Art color scheme 80
4.13 Physical models - view 1 80
4.14 Physical models - view 2 81
4.15 Physical models - color variation 81
4.16 Physical model - floor lamp lights on 82
4.17 Physical model - floor lamp lights off 83
4.18 Clothes hanging rack detail 1 84
4.19 Clothes hanging rack detail 2 84
4.20 Clothes hanging rack detail 3 85
4.21 Physical models - view 3 86
4.22 Physical models with plants 87

List of Tables

3.1 The basic design method of form of Nendo - 1 40

3.2 The basic design method of form of Nendo - 2 41

3.3 New materials suggested by Material ConneXion (2016) 61

Chapter 1

INTRODUCTION

1.1 Problem Statement

Today, with the development of modern civilization, the pursuit of product appearance has continued to advance. Vision is the most important sense organ for human beings, as more than 80% of the information that perceived from the outside world is sensed by the eyes. When a person select a product, the first thing to notice is its appearance. A visually compelling product promises to stimulate the senses of consumers, triggering the desire to purchase and bring happiness and satisfaction to modern daily life.

There are many famous visually compelling products in the market, such as the curious three-legged aluminum lemon squeezer designed by Philip Starck. The reason why they become famous is not because of their function, but often because of their stunning appearance. Hence, acknowledging the methods to design a visually compelling product is essential for either a company or designers. However, there are many ways to interpret the concept. When we think a product as visually compelling, it is hard to define how, and why it is visually compelling.

This thesis will give a definition of a visually compelling product, and then propose a universal guideline of creating a visually compelling product for designers.

1.2 Need of Study

In general, visually compelling product design is a branch of emotional design. Attractive things make people feel good, which in turn makes them think more creatively (Norman, 2004).

In this study, a definition of visually compelling products need to be worked out, based on its connection to emotional design. The universality and individuality of this group of products need to be summarized.

Some remarkable cases or styles that are related to this study can be found in the river of industrial design history. The visually compelling elements of different product categories can be varied, so there is a need to classify those elements into a guideline. To address this gap of knowledge, a specific outline of the visually compelling elements needs to be studied and developed.

1.3 Objectives of Study

This thesis presents an approach for helping companies and designers to design a visually compelling product. The following are the objectives of this thesis.

- Study the relevant knowledge of aesthetics
- Study the relevant knowledge of emotional design
- Study the relevant product design
- Study the cases of commonly accepted visually compelling products
- Define a visually compelling product
- Sum up the methodology to design a visually compelling product
- Apply the design guideline to product design

1.4 Assumptions

This thesis proposes a new terminology: visual focusing point. A visual focusing point (VFP for short) is the most visually appealing and interest-stimulating part of a product. In this study, it is assumed that designers are able to design a visually compelling product by using a checklist of the VFPs.

1.5 Scope and Limits

Scope of Study: This study focuses on the methodology of designing a visual compelling product. The aim of this guideline is to be universal and such that it can be applied in all categories of product in today's market. The guideline works well in modern environments, such as urban areas in the United States.

Limits of Study: There are several limits in this study as follows:

- The product selection of this study does not cover every product genre.
- Visually compelling can be positive or negative. This thesis mainly focuses on the design process of positive visually compelling products in daily life.
- Because the future of certain trends and their appreciation cannot be anticipated, this study will only analyze the characteristics from existing products.
- Because the future development cannot be anticipated, the approach is limited by time constraints. Further research will need to be done in the future.

1.6 Procedure and Methods

Plan of procedures and methodology:

- Study design elements of general products.
- Study how to define a visually compelling product.
- Conduct case studies of existing products that are commonly accepted as visually compelling products.
- Develop an approach to help design a visually compelling product.
- Examine the approach through designing a visually compelling product.
- Evaluate the effectiveness of the approach.

1.7 Anticipated Outcomes

The anticipated outcome of this study is a design approach that will help designers and companies to design a visually compelling product that has a greater potential for success in the market. The appeal of visual stimuli will enhance user satisfaction and influence the perceived usability.

Chapter 2

LITERATURE REVIEW

2.1 Introduction

When visiting a design exhibition, why do people dwell for 20 minutes in front of one product, and only 10 seconds in front of another? What is it that makes one product more striking and eye-catching, and another barely noticeable? To begin with, a designer must understand the consumer response to the visual domain in product design, the relationship between emotion and aesthetics, and the connection between historical art genre and contemporary design. In the end of this chapter, a definition of the visually compelling product will be given, thus allowing the characteristics of this kind of product to be analyzed.

2.2 Aesthetic Impression in Product Design

Aesthetics is variously defined as beauty in appearance (Lavie & Tractinsky, 2004), visual appeal (Lindgaard & Dudek, 2003), an experience (Ramachandran, 1999), an attitude (Cupchik, 1993), a property of objects (Porteous, 1996), a response or a judgment (M. Hassenzahl, 2002), and a process (Langer, 1967). The common theme in all these terms is that aesthetics is mostly related to pleasure and harmony which we all are able to experience. In the early 1900s, Herbert Read, best known for numerous books on art and aesthetics, stated, "it requires a somewhat mystical theory of aesthetics to find any necessary connection between beauty and function." That belief is still largely accepted today (cited in Norman, 2004, p.18).

The visual appearance of products is a significant determinant of consumer reaction and product success (Bloch, 1995). Judgments are frequently made on the elegance (Coates, 2003),

functionality (Mono, 1997) and social significance (Dittmar, 1992) of products based primarily on visual information. These judgments interact with the perceived traits of products commonly based on the satisfaction of consumer needs and requests (Lewalski, 1988).

Users' necessities of outlined items have every now and again been contrasted with Maslow's (1987) hierarchy of command of needs (Lewalski, 1988). This recommends once issues of utility, wellbeing and solace have been fulfilled, accentuation may move towards enhancing, enthusiastic and emblematic properties of plan. Along these lines, contingent upon inspiration and setting, an item's apparent qualities might be of more noteworthy significance than its substantial properties. This is on the grounds that appearances are important (Viemeister, 2001), and "purchasers don't simply purchase an item, they purchase an incentive as amusement, experience and identity" (Esslinger, 1999, p.9).

Figure 2.1: Basic model of communication (Shannon, 1948)

When communicating through design, Shannon developed a basic system of communication as comprising five elements (Figure 2.1): source, transmitter, channel, receiver and destination. The message produced by the information source is transferred into a signal and transmitted across a channel. The receiver decodes the signal and the message arrives at the destination (Shannon, 1948).

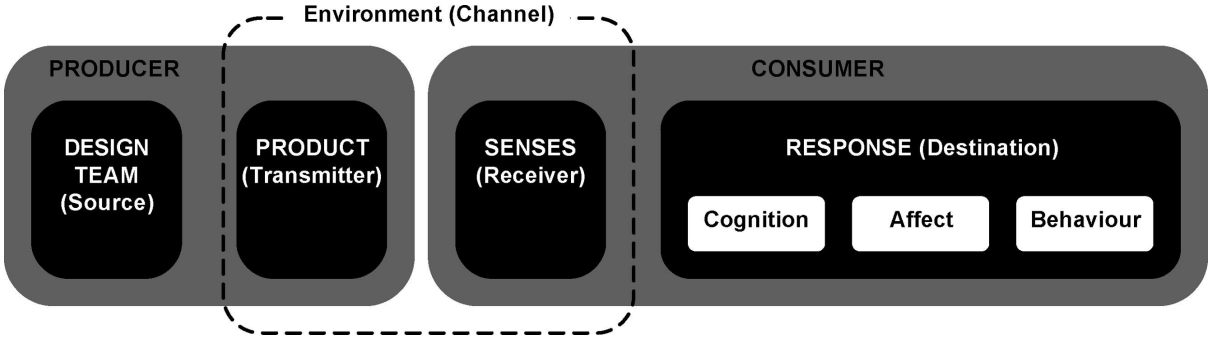


Figure 2.2: Basic model of communication (Shannon, 1948)

Mono (1997) has applied this basic model of communication to the study of product design. The producer of the product takes the responsibility for design and manufacture. The designer, or the design team, can be regarded as the source of the message. The product itself can be viewed as the transmitter of the message, and the environment in which the consumer interacts with the product can be regarded as the channel. The consumers are involved in both the subsequent response and the perception of products. Consequently, the consumer's perceptual senses can be regarded as the receiver of the design message and their faculty for response may be regarded as the destination.

The traditional view of consumer behavior presents response to products as comprising cognition and affect, which are followed by behavior (Bloch, 1995). Thus, the result may be divided into these three aspects of response: cognition, affect and behavior (see Figure 2.2). Each of these elements of the communications model will be discussed as follows (adapted from Crilly, Moultrie, & Clarkson, 2004).

Design team (source) The design team makes decisions that determine what the product form should visually convey (Gotzsch, 2000). The design team may be represented by the individuals involved in the project, the design activities they utilize, and the association or administration of these exercises.

Product (transmitter) The physical product may be defined by its geometry, dimensions, textures, materials, colors, graphics and details (Hannah, 2002). The perceived novelty, style and personality of products are not included here to be characteristics of the product because they are not objective qualities of the design. Alternately, they are presented as aspects of the consumers' psychological response to the product.

Environment (channel) The environment within which the product is to be perceived may be characterized by the physical conditions of the context of interaction. Of particular interest when considering the visual perception of products are issues of illumination (Mayall, 1967). If relevant, consideration must be given to the media with which the product is to be represented, for example, photographic marketing material and packaging.

Senses (receiver) The signal transmitted by the product is received by the physiological senses (Mono, 1997). With regard to the perception of product form, vision is of primary importance. If consideration is to be given to other sensory aspects of design then touch, taste, smell and hearing also all can become significant. The complexities of perceptual psychology are not presented here; it is sufficient to state that our visual perception of objects may not be an accurate reflection of their physical state (Hoffman, 1998).

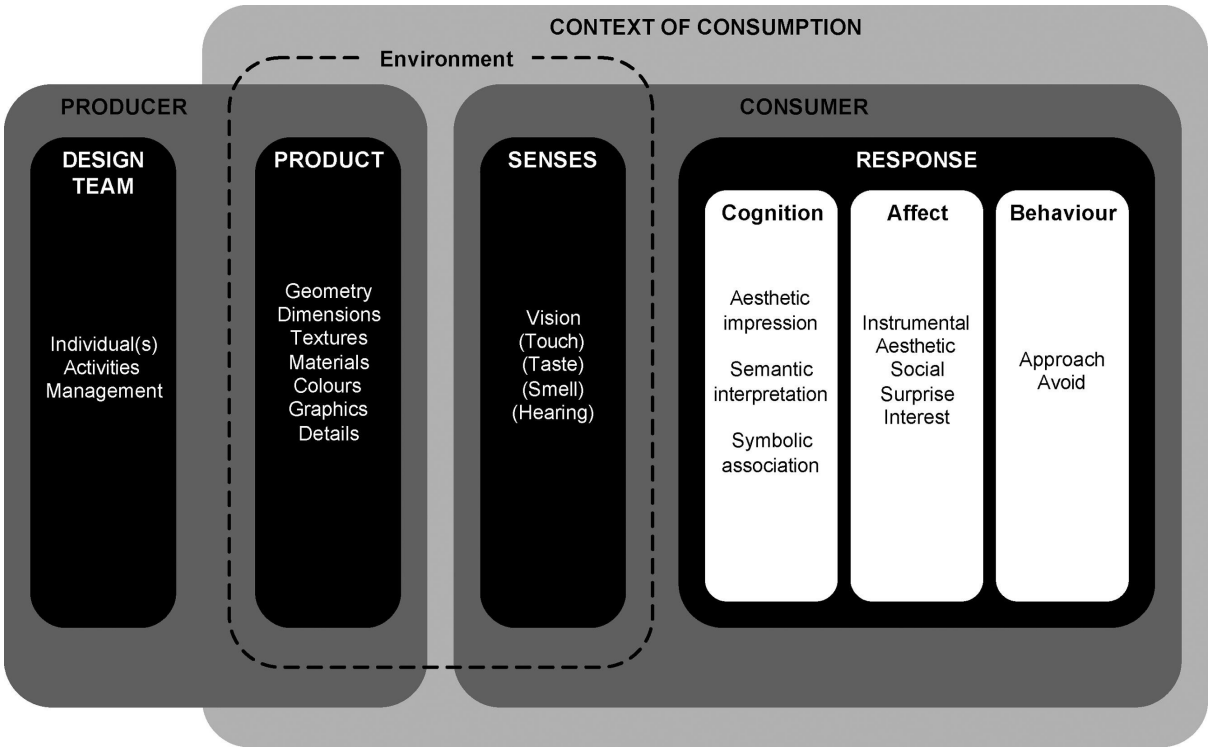


Figure 2.3: Basic model of communication (Shannon, 1948)

Cognitive response (destination) Cognitive response refers to the judgments that the user or consumer makes about the product based on the information perceived by the senses. These judgments include evaluation of the products' perceived qualities. In the existing literature, it is more accepted to use the following three categories to describe cognitive response to product appearance: aesthetic impression, semantic interpretation and symbolic association (Figure 2.3) (Ray & Paul, 1992).

- Aesthetic impression may be defined as the sensation that results from the perception of attractiveness (or unattractiveness) in products.

- Semantic interpretation may be defined as what a product is seen to say about its function, mode-of-use and qualities.
- Symbolic association may be defined as the perception of what a product says about its owner or user: the personal and social significance attached to the design.

These elements of response are not presented as objective qualities of the product. They are classifications for different aspects of cognitive response to product form. Although often convenient to do so, it is not entirely accurate to describe products as being aesthetic, having semantic attributes or possessing symbolic qualities. Instead, these are all aspects of cognition driven by both the perception of tangible stimuli and pre-existing knowledge. Although there is often consensus amongst groups and within eras, viewers in different circumstances may have make different understandings (Forty, 1986).

Affective response (destination) It has been well established that products elicit emotional responses (Frijda, 1986). Consumers may experience a variety of potentially contradictory feelings towards an object, such as admiration, disappointment, amusement and disgust (Desmet, 2003). Typically, these feelings will be relatively mild when compared to the possible spectrum of human emotions (Desmet, 1999).

Behavioural response (destination) Consumers' psychological response (comprising cognition and affect) influences the way in which they behave towards the product (OShaughnessy, 1992). Marketers frequently use the terms *approach or avoid* to distinguish between the behavioral responses of interested and disinterested consumers. Approach responses may be associated with further investigation of the product, product purchase and product use. Avoid responses may be associated with ignoring the product, failure to purchase, product abuse and even hiding the product (Bloch, 1995).

The consumer's cultural context The culture, background and experiences of the consumer are influential in determining their response to products (Bloch, 1995). The designers and consumers of a given product are often (but not always) separated by time, place or social

group. As such, the context of consumption within which the consumer operates is an important consideration. It is within this context that the design message is interpreted and from which influences on this interpretation originate.

2.3 Emotional Design: Why Attractive Things are Important

Human beings cannot live without emotion. "We scientists now understand how important emotion is to everyday life, how valuable. Sure, utility and usability are important, but without fun and pleasure, joy and excitement, and yes, anxiety and anger, fear and rage, our lives would be incomplete." (Norman, 2004, p.7) In this section, the importance of Emotional Design will be introduced.

2.3.1 Introduction of Emotional Design

Emotional Design is a concept that introduced and developed by American cognitive scientist and usability engineer Donald Norman. His theories play an important role in today's design philosophy. The purpose of Emotional Design is to create products that express emotions appropriately, in order to create a positive user-experience. To this end, designers consider the connections that can form between users and the products they use, and the emotions that can come out from them. The emotions a product elicits can highly influence users' cognition of it. Our topic, the visually compelling product, is highly related to emotional design since an eye-appealing design must bring an emotional touch to people, such as pleasure and happiness. Thus, it is essential to know how to make things attractive with the knowledge of Emotional Design.

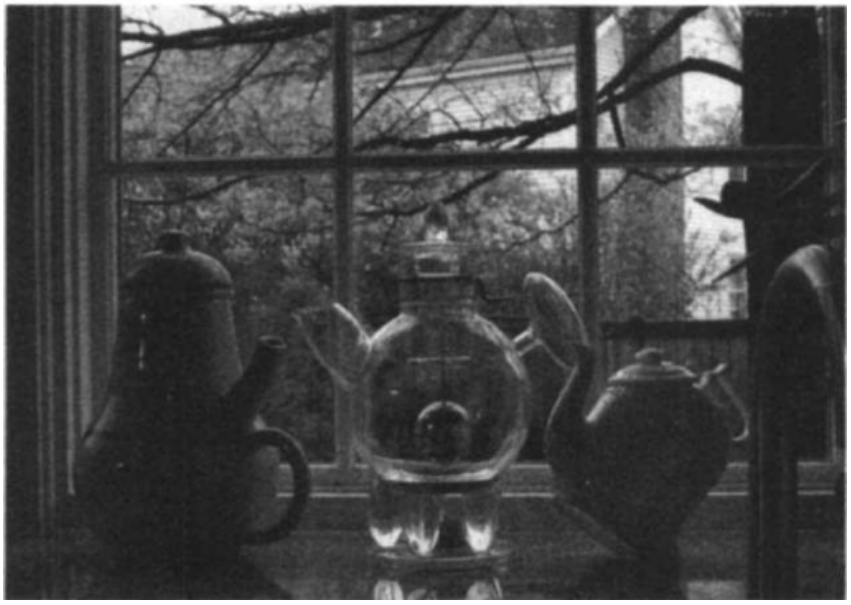


Figure 2.4: The three teapots mentioned by Norman (Norman, 2004)

Emotions play a central role in the human ability to perceive the world. In the book *Emotional Design: Why We Love or Hate Everyday Things*, Norman (2004) talked about his teapots collection: Three teapots each in contrasting unique shape which always light up his day. He states:

> The story of the teapots illustrates several components of product design: usability (or lack thereof), aesthetics, and practicality. In creating a product, a designer has many factors to consider: the choice of material, the manufacturing method, the way the product is marketed, cost and practicality, and how easy the product is to use, to understand. But what many people don't realize is that there is also a strong emotional component to how products are designed and put to use (p.4).

In Norman's book, he argues that the emotional side of design may be more critical to a product's success than its practical elements.

> The teapots also illustrate three different aspects of design: visceral, behavioral, and reflective. Visceral design concerns itself with appearances. Here is where the

Nanna teapot excels I so enjoy its appearance, especially when filled with the amber hues of tea, lit from beneath by the flame of its warming candle. Behavioral design has to do with the pleasure and effectiveness of use. Here both the tilting teapot and my little metal ball are winners. Finally, reflective design considers the rationalization and intellectualization of a product. Can I tell a story about it? Does it appeal to my self-image, to my pride? I love to show people how the tilting teapot works, explaining how the position of the pot signals the state of the tea. And, of course, the 'teapot for masochists' is entirely reflective. It isn't particularly beautiful, and it's certainly not useful, but what a wonderful story it tells! (p.5)

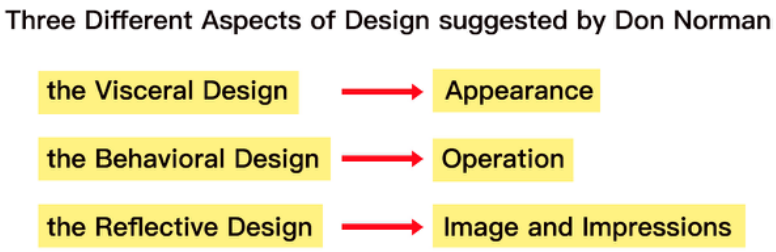


Figure 2.5: Three different aspects of design suggested by Norman (2004)

The design requirements for each level are widely different.

In short, the visceral level design is concerned about the appearance. It is pre-consciousness, pre-thought. It is where the first impressions are formed. Visceral design is about the initial impact of a product, about its appearance, touch, and feel.

The behavioral design is concerned about the operation. It is about use, about experience with a product. While experience itself has many facets, such as function, performance, and usability, if the product does what is needed, if it is fun to use and easy to satisfy goals with it, then the result is warm and positive.

The reflective design is concerned about the image and impressions. It is only at the reflective level that consciousness and the highest levels of feeling, emotions, and cognition reside. It is only here that the full impact of both thought and emotions are experienced. At the lower

visceral and behavioral levels, there is only affect, but without interpretation or consciousness. Interpretation, understanding, and reasoning come from the reflective level (Norman, 2004).

These three dimensions are essential to any design.

2.3.2 The Connection between Emotions and Aesthetics

Along with emotions, there is one other area for designers to pay attention to as well: aesthetics, attractiveness, and beauty.

Aesthetically pleasing objects enable people to work better. Products and systems that make people feel good are easier to deal with and produce more harmonious results.

> When you wash and polish your car, doesn't it seem to drive better? When you bathe and dress up in clean, fancy clothes, don't you feel better? And when you use a wonderful, well-balanced, aesthetically pleasing garden or woodworking tool, tennis racket or pair of skis, don't you perform better? (Norman, 2004, p.10)

Thus, it is easy to explain how aesthetics affect how easy something is to use: aesthetically pleasing products can arouse people's positive feeling, while emotions change the way the human mind solves problems. The emotional system changes how the cognitive system operates.

Moreover, emotions play a critical role in daily lives, helping assess situations as good or bad, safe or dangerous (Norman, 2004). The psychologist Alice Isen and her team (2000) have shown that being happy widens the thought processes and facilitates creative thinking. When people feel good, Isen discovered, they are better at brainstorming, at examining multiple alternatives. And it doesn't take much to make people feel good. All Isen had to do was ask people to watch a few minutes of a comedy film or receive a small bag of candy. Isen's results show that when people are relaxed and happy, their thought processes expand, becoming more creative, more imaginative. Positive experiences kindle our curiosity, and negative ones protect us from repeating mistakes. A designer should address the human cognitive ability at each level: to elicit appropriate emotions so as to provide a positive experience. A positive

experience may include positive emotions (e.g., pleasure, relief) or negative ones (e.g., fear, anxiety), depending on the context.

2.4 Case Studies on Emotional Design

In this section, two representative case studies will be discussed. Results of analysis of two design cases through their different aspects can be a support of the design principal of visually compelling products induced later in Chapter 3.

2.4.1 3.2.1 Case Study: Lemon Squeezer Designed by Philip Starck

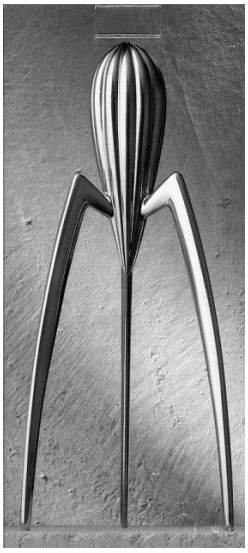


Figure 2.6: Original photograph for Juicy Salif packaging (copyright Alessi, 1987)

Designers themselves are often not very good at explaining how they design. When designers, especially skilled, successful designers, talk spontaneously about what they do, they talk almost exclusively about the outcomes, not the activities leading to those outcomes. They talk about the products of their designing, rather than the process. This is a common feature of experts in any field. Their enthusiasm lies in evaluating what they produce, and not in analyzing how they produce it (Cross, 2011). Some designers can even seem to be obscure about how they work, and where their ideas come from. The world renowned French designer Phillip Starck has said that when he designed his iconic lemon squeezer for the Italian kitchenware manufacturer

Alessi in a restaurant, “the vision of a squid-like lemon squeezer came upon me...” (Figure 2.6 and Figure 2.7) And so, Juicy Salif, the lemon squeezer, went into production and became a phenomenally successful best-selling product.

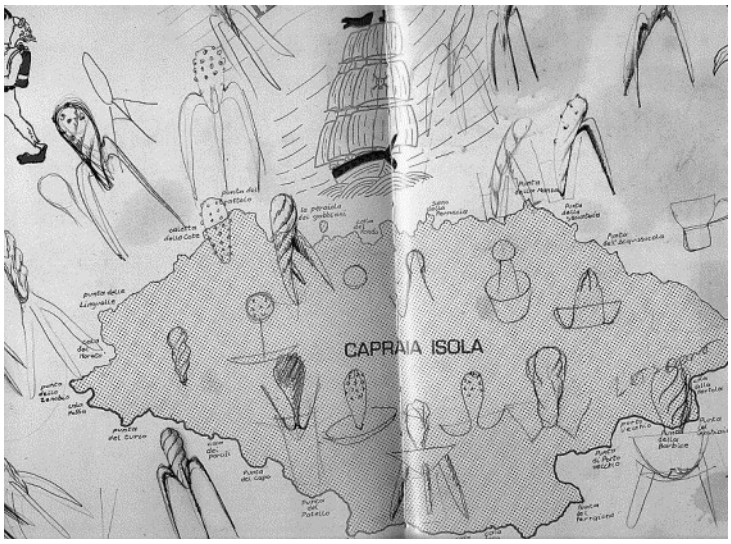


Figure 2.7: Table mat showing Philip Starcks original sketches for what was to become the Juicy Salif lemon squeezer (Lloyd & Snelders, 2003a)

The shape of the lemon squeezer is unique and mysterious. How did Starck come up with the idea? After a bit of historical delving into the life of Starck, quite a plausible account of why this squid-like lemon squeezer was significant to Starck, and not to the other people who were eating the squid in the restaurant that night, can be developed (Lloyd & Snelders, 2003b). Philip liked looking at Sci-Fi cartoons and aircraft design (Aldersey-Williams, 1987) since he was a child. He spends much of his time re-drawing characters and objects from comic strips(Figure 2.8), particularly the spaceships (Figure 2.9). He likes looking backwards too, but always with an eye on the future of history. The idea of organic evolution fascinates him (Nobel, 1998).

Figure 2.8: The world under attack by aliens, La guerre des mondes (Lloyd & Snelders, 2003a)

Figure 2.9: A rocket from the French cartoon strip of Flash Gordon, Vol 1, 1934, (Lloyd & Snelders, 2003a)

In terms of materials, the lemon squeezer is made from cast, polished aluminum. Compared with steel, aluminum is a modern metal, one that has associations with aircraft, with lightness, and with anti-corrosion. The lemon squeezer will not rust away; it has a feeling of permanence about it. This permanence is emphasized by the temporariness of its rubber feet. The user instructions rather apologize for the fact that the rubber feet will wear out, noting that new ones can be bought should they do so. The feeling of the object's permanence also comes from the method of making the squeezer: casting. It is a simple, traditional technique, that sometimes produces imperfections, but generally works well. Strong things are usually cast.

Industrial revolutions were founded on cast iron as an industrial material. The modern material is, then, underpinned by a traditional technique. The result is a monument, standing with the 'power' graphic perspective of socialist realism (Lloyd & Snelders, 2003b).

Figure 2.10: Lemon squeezer in the market (from left to right, top to bottom: Amazon, n.d.; Aliexpress, n.d.; Connox, n.d.; The Giftbooth, n.d.; Crate and Barrel, n.d.; Amazon, n.d.; Designswan, n.d.; Blomus, n.d.; Briscoes, n.d.)

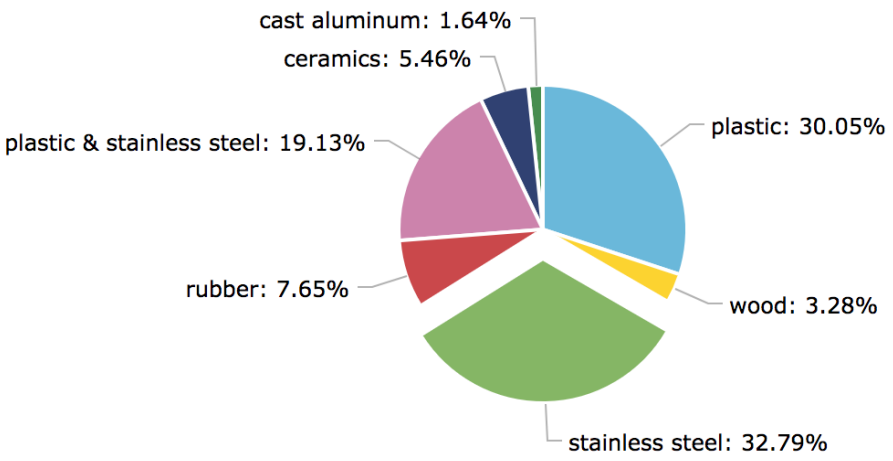


Figure 2.11: Pie chart of various materials of lemon squeezers in the market, n.d.

Researching the current market shows that the most common material of lemon squeezer is stainless steel (Figure 2.10 & Figure 2.11). The second common material is plastic. Both of them are easy to clean, good for kitchenware and cheaper than aluminum casting. The appearance of the common lemon squeezers mostly follows the rule “form follows function”, coined by American architect Louis Sullivan, 20th-century in the field of modernist architecture and industrial design.

In terms of function, Starck’s lemon squeezer is lack of practicality. As a hand tool for kitchen, people say that it does not work. It does not fulfill the function of the lemon squeezer, they argue, because the pips get squeezed out along with the juice, and who wants to chew on a lemon pip when enjoying a paella? Philip is used to criticism and he points out that the reason why choose to design in this case not to squeeze lemons, even though as a lemon squeezer it works. Sometimes people need some more humble service: on a certain night, the young couple, just married, invites the parents of the groom to dinner, and the groom and his father go to watch football on the TV. And for the first time the mother of the groom and the young bride are in the kitchen and there is a sort of malaise this squeezer is made to start the conversation (Starck, 1998). Here comes the significance of an attractive product: it brings to us additional emotional value.

In conclusion, the styling inspiration of "Juicy Salif" came from two aspects: Science Fantasy and Organic Shape (the baby squid); the material is cast aluminum, which represents modernity, permanence and futurism; the function is below the average level but it brings additional value of emotion such as happiness and freshness. The visual focusing points of "Juicy Salif" are the shape and material, which make it stand out from other product of the same category.

2.4.2 Case Study: Design Language of the Automotive Brand MINI

Mini (stylized as MINI) is a British automotive marque, owned by BMW since 2000, and used for a range of small vehicles. The word Mini has been used in car model names since 1959, and it became a marque in its own right in 1969.

Figure 2.12: MINI Cooper Hardtop 2 Door, MINI (2018)

Different from other cars in the market, MINI has a distinguished round and smooth looking shape. In reviewing BMW's MINI Cooper car (Figure 2.12), the New York Times observed: "Whatever one may think of the MINI Cooper's dynamic attributes, which range from very good to marginal, it is fair to say that almost no new vehicle in recent memory has provoked more smiles." The car is so much fun to look at and drive that the reviewer suggests you overlook its faults (Norman, 2002).

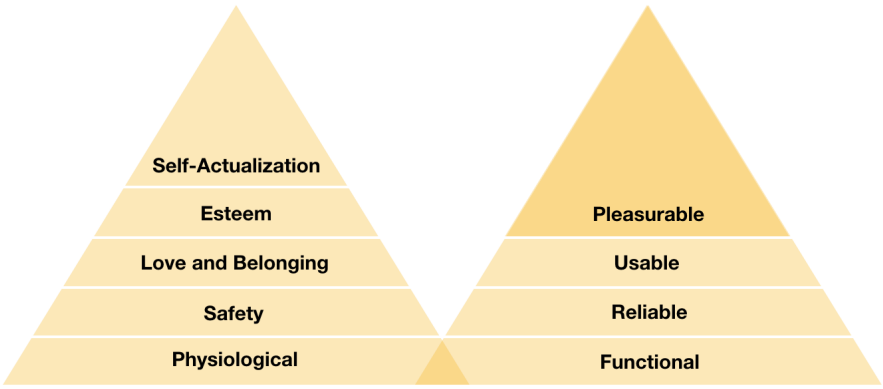


Figure 2.13: Comparison of Maslow's hierarchy of need and people's increasing products needs (Yefan, 2012)

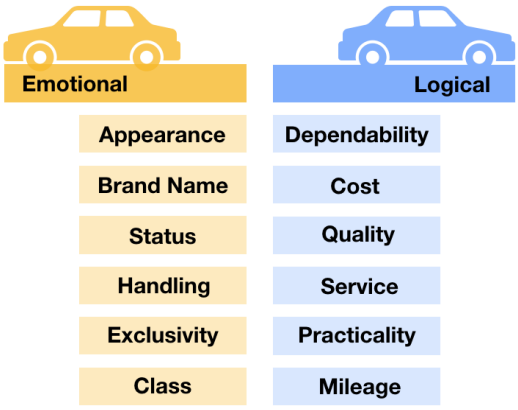


Figure 2.14: Complexity of decision making when buying a car (Agco, 2014)

How does the customer make decision to purchase a product? Maslow's hierarchy of needs (Huitt, 2007) deals with human needs that are crucial for personal development, motivation and self-actualization. Figure 2.13 and Figure 2.14 above show the complex mechanisms at work when people decides to choose one product rather another. The top part (Figure 2.13) of the second pyramid deals with emotions and aesthetics compared to the bottom part of the pyramid that deals with functions.

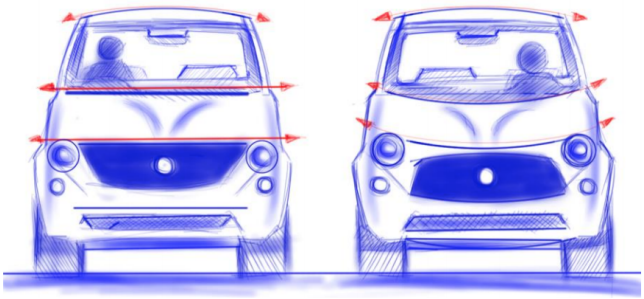


Figure 2.15: Straight lines or a curved line creates certain emotions (Kagali,2014)

Figure 2.16: Minor changes in MINI Cooper design creates different emotions (Kagali,2014)

Objects like the MINI evoke strong, positive emotions such as love, attachment, and happiness. Emotions are inseparable from and a necessary part of cognition. Everything we do, everything we think is tinged with emotion, much of it subconscious. In turn, our emotions change the way we think, and serve as constant guides to appropriate behavior, steering us away from the bad, guiding us toward the good (Norman, 2002).

Figure 2.17: Outside mirrors, (Seattle-MINI, 2005)

Figure 2.18: Eyelash for MINI (Eyelashes-For-Cars, n.d.)

The exterior forms of MINI contains various curved, streamlined elements, and some parts are even very cute to look at: The oval side view mirrors, the oval headlights and the chubby rear. Due to these significant features, MINI even comes with its own by-products line such as the Outside Mirror cover art (Figure 2.17) and eyelashes for their headlights(Figure 2.18). These decorations have been popular for decades since they provide extra emotional value to customers. Although MINI has certain shortcomings such as smaller storage space of trunk,

stiff suspension and lower driver visibility, their customers will still make the decision to buy it due to its outstanding emotional values.

2.5 Definition of a Visually Compelling Product

In summary, a visually compelling product should be defined as:

- Unique appearance that stands out from other products on the existing market
- The user expectation of the function might be different from the actual operation due to the combination of unique form and physical function
- The product can arouse users' positive feeling and curiosity and stimulate creative thinking

2.5.1 Research on Eye Tracking

Eye tracking is the process of measuring either the point of gaze (where one is looking) or the motion of an eye relative to the brain. Eye trackers are often used in research on the visual system as an input device for human-computer interaction, and in product design. Ping Du and Dr. Erin MacDonald (Du & MacDonald, 2014), from Iowa State University, conducted an eye-tracking incorporated product design study in order to research the usefulness of eye-tracking data during product design. Their research shows that the more important features were viewed earlier, more frequently, and for a longer time.

However, the technology of eye tracking is not applied in this thesis due to the following reasons:

- Lack of time for practical application
- It is unable to determine whether or not the results of visual perceptions of the important feature is positive or negative

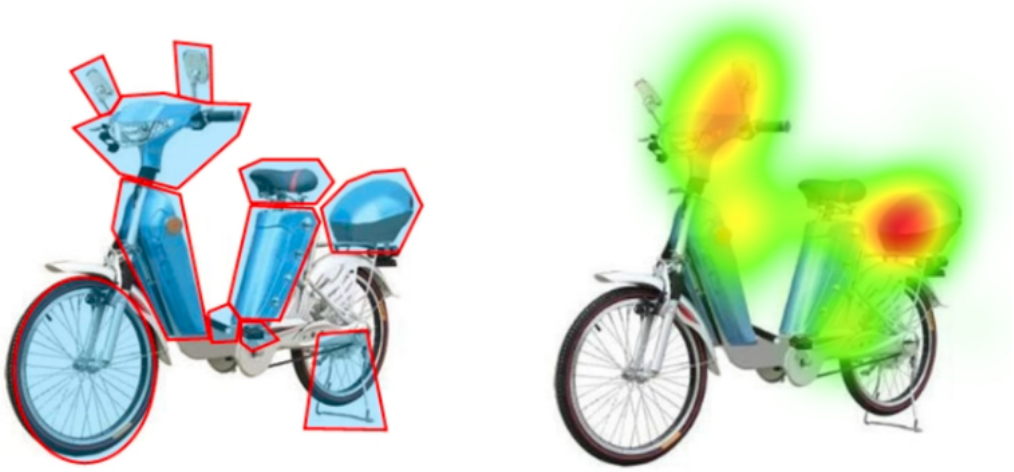


Figure 2.19: Visual focus detected by eye tracking

2.6 Inspirations from Design History

Learning the history of design can help designers improve aesthetics level and build personal knowledge structure of product design. Different from functionalism, some genres are appealing to the eyes because of their vivid visual identity and interesting form language. Examples from design history can provide strong argument to this study as a history background reference of visually compelling product.

In this section, selected genres will be enumerated according to the time they took place.

2.6.1 Surrealism

Surrealism, a cultural movement that began in the early 1920s in France, is best known for its distinct visual artwork and literature. Artists painted unnerving, illogical scenes with photographic precision, created strange creatures from everyday objects, and developed painting techniques that allowed the unconscious to express itself. (Barnes, 2001. Its aim was to "resolve the previously contradictory conditions of dream and reality into an absolute reality, a super-reality" (Breton, 1924).

The Surrealists pursued to develop the unconscious as a means to unlock the power of the imagination. Rejecting rationalism and literary realism, and strongly influenced by psychoanalysis, the Surrealists believed the rational mind restricted the power of the imagination, driving it down with taboos. Also, influenced by Karl Marx, they hoped that the psyche had the power to reveal the contradictions in the daily life and spur on revolution. Their emphasis was on the strength of personal imagination and belief that revelations could be found everywhere. The Surrealist urged to tap the unconscious mind, and their interests in myth and primitivism continued to shape many later movements, and the style continues to influence today's world.

Surrealism artwork often feature the element of surprise with random objects and unpredictable juxtapositions. In the field of visual arts, Surrealist painting can be distinguished into two styles. Artists such as Salvador Dali, Yves Tanguy, and Rene Magritte painted in a hyper-realistic style. Objects in their painting were depicted in delicate detail and with the illusion of three-dimensionality, highlighting their extraordinary dreamy imagination. The color in these artworks was often either saturated (Dali) or monochromatic (Tanguy) both seek to convey a dream space.

The Persistence of Memory
(1931, Salvador Dalí)

Salvador Dalí Inspired Melting Table Clock
(2010s, Modern Home)

In memory of Dali, electronic clock
(2013, Voja Antonić)

Figure 2.20: Representative artwork of Salvador Dali and its inspired clocks

Often seen at gift stores in Spain, the Salvador Dali-inspired Melting Clock is still popular as a gift or souvenir in the modern life. No matter the time period, people will always stop by in front of it and be wonderstruck by its unique appearance. The entire body is solid but flows like liquid, the dial bent into a right angle which perfectly fits to the edge of a table. Serbian inventor Voja Antonic even designed an electronic clock in homage to Dali. He challenged

to make the bending shape of the clock - electronic components and diffuse white LEDs are placed on two handmade PCBs, placed and soldered the light shields between segments with different shapes, differently curved lines and differently cut. The digital segments on the front plate were etched by ferichloride, so the material remained transparent. The clock was a part of Antonic's LED Art exhibition in Belgrade (Antonic, 2013). Antonic brings Dali's imagination into real modern life after over 80 years later, and it still surprises people.

Design vs. Novelty

Figure 2.21: Design vs. Novelty

Converting the artwork of Surrealism into real product is a quick way to make something visually compelling, since it is a fantasy combination of random elements and has never been seen

in reality, according to its basic principle. It is arguable that the product of melting clock is novelty, not design. Novelty is the quality of being new, or following from that, of being striking, original or unusual (Definition of novelty, 2018). Designers can take it as an inspiration when designing a gift or souvenir. Compared to the design for the mainstream, the design for the minority is also noteworthy. For instance, the majority of people would like to purchase a normal trashcan for their home just for regular daily usage, while the minority would like to buy a frog-like trashcan to bring some pleasure and freshen their mind. Thus, there is a group of designs that meet the needs of the minority and will not fade away in current diverse society due to multiple emotional demands.

2.6.2 Pop Art

Pop Art is an art movement that emerged in the United Kingdom and the United States during the mid- to late-1950s (Livingstone, 1990). The movement challenged traditions of fine art by comprising imagery from popular culture and mass culture, such as comic books, commercial advertisement and the mundane world. One of its aims is to use images of popular culture (as opposed to elitist) in art, emphasizing the banal or kitschy elements of any culture, most often through the use of irony. In Pop Art, the artists use of mechanical methods of reproduction or rendering techniques is a key factor. Material is sometimes combined with unrelated material, isolated, or visually removed from its known context.

Richard Hamilton is the prophet of Pop Art, since he organized the epic exhibition *This Is Tomorrow* (Whitechapel Art Gallery, London, 1956) and called for the army of Pop Artists in the Sixties. Richard Hamilton's representative work, *Just what is it that makes today's homes so different, so appealing?*, was the first work of Pop Art to achieve iconic status. It was a collage consisting of images taken mainly from American magazines. Today, we group Andy Warhol, Roy Lichtenstein and Keith Haring together as the most remarkable artists of the time.

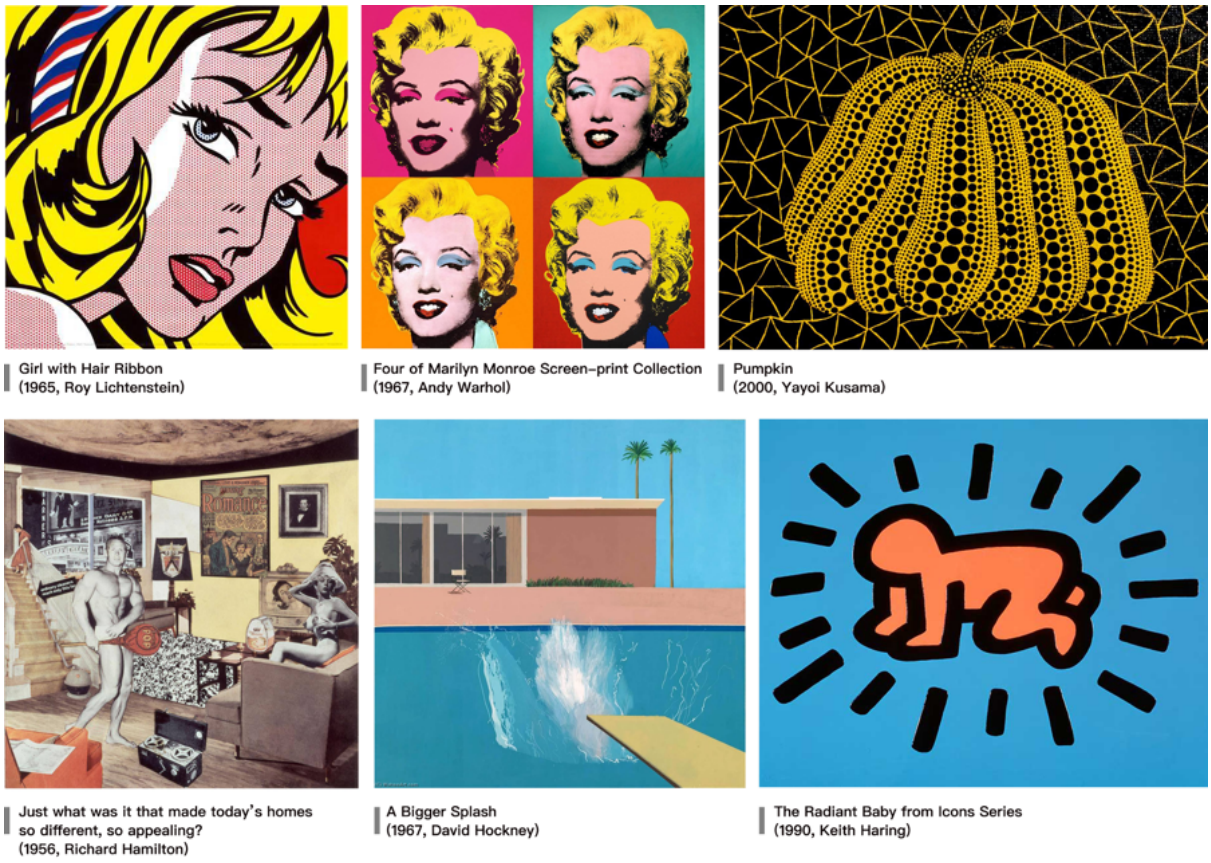


Figure 2.22: Representative artworks of Pop Art

Some of the noted forms that Pop Art took were Andy Warhol's meticulously colorful literal paintings and silk-screen prints of celebrity icons, soup-can labels and rows of soft-drink bottles; Roy Lichtenstein's stylized reproductions of comic strips using the color dots and flat tones of commercial printing; David Hockney's bright swimming pools in synesthetic color, which is a strange brew of calm and hyperactivity; and Keith Haring's symbolic bold lines, vivid colors, and active figures which carry strong messages of life and unity.

Although Pop Art began with graphics, it never stopped influencing the industry of industrial design. In 1956, American industrial designer and one of the founders of American Modernism George Nelson designed the attractive Marshmallow Sofa. The atom-like appearance of the Marshmallow Sofa is a precursor to the aesthetic style of the Pop Art. At first, the concept was launched when an inventor approached George Nelson and Irving Harper with a planned "self-skinned" injection plastic disc that would be inexpensive to produce and

unerringly durable. As the proposed cushions had a maximum diameter of 12 inches, the designers perched 18 of them atop a steel frame. Sadly, the inventor's vision for high-resiliency, low-cost cushions never came to reality, but the design was so compelling that Herman Miller (a major American manufacturer of furniture) decided to produce it anyway. If only all design "failures" were so successful. Today, Herman Miller is still selling the Marshmallow Sofa and the color varies from black to pop color such as orange, red and purple. The design features detachable cushions that are both easy to clean and interchangeable to equalize wear, which feeds the need of contemporary urban life.

Marshmallow Sofa
(1956, George Nelson)

Vintage Vespa Poster
(1960s, Vespa)

Love (sculpture)
(1970, Robert Indiana)

Figure 2.23: Furniture, poster and sculpture inspired by Pop Art

When think about famous vehicles from the old black-and-white Hollywood movie, the Vespa will definitely come to mind. The Vespa, the world-known Italian brand of scooter, is a significant success of vehicle design in the 1960s. As a media of commercial advertising, Pop Art-inspired poster design push its sales volume to the top.

The *LOVE* Sculpture is another symbol of Pop Art popular over time. Originally, *LOVE* was a Pop Art image by American artist Robert Indiana in 1964 as a print image for a Museum of Modern Art Christmas card. Today, Indiana's *LOVE* design has since been reproduced in a variety of formats for rendering of sculptures in displays around the world. Jeff Jaffe, the co-owner of Pop International Galleries in New York states that Pop Art is stronger than ever (Marinica, 2016).

The color selection and form language of Pop Art inspired furniture is a good inspiration of visually compelling products since they use vivid color, adapted to multiple forms and challenge new materials.

2.6.3 Deconstructivism

Deconstructivism is a movement of postmodern architecture which appeared in the 1980s, which gives the impression of the fragmentation of the constructed building. It is characterized by an absence of harmony, continuity, or symmetry (Taschen & Taschen, 2016) which can be inspirations for visually compelling products due to the visual impacts of its form construction. The name comes from the idea of "Deconstruction", a form of semiotic analysis developed by the French philosopher Jacques Derrida ("Deconstructivism", n.d.).

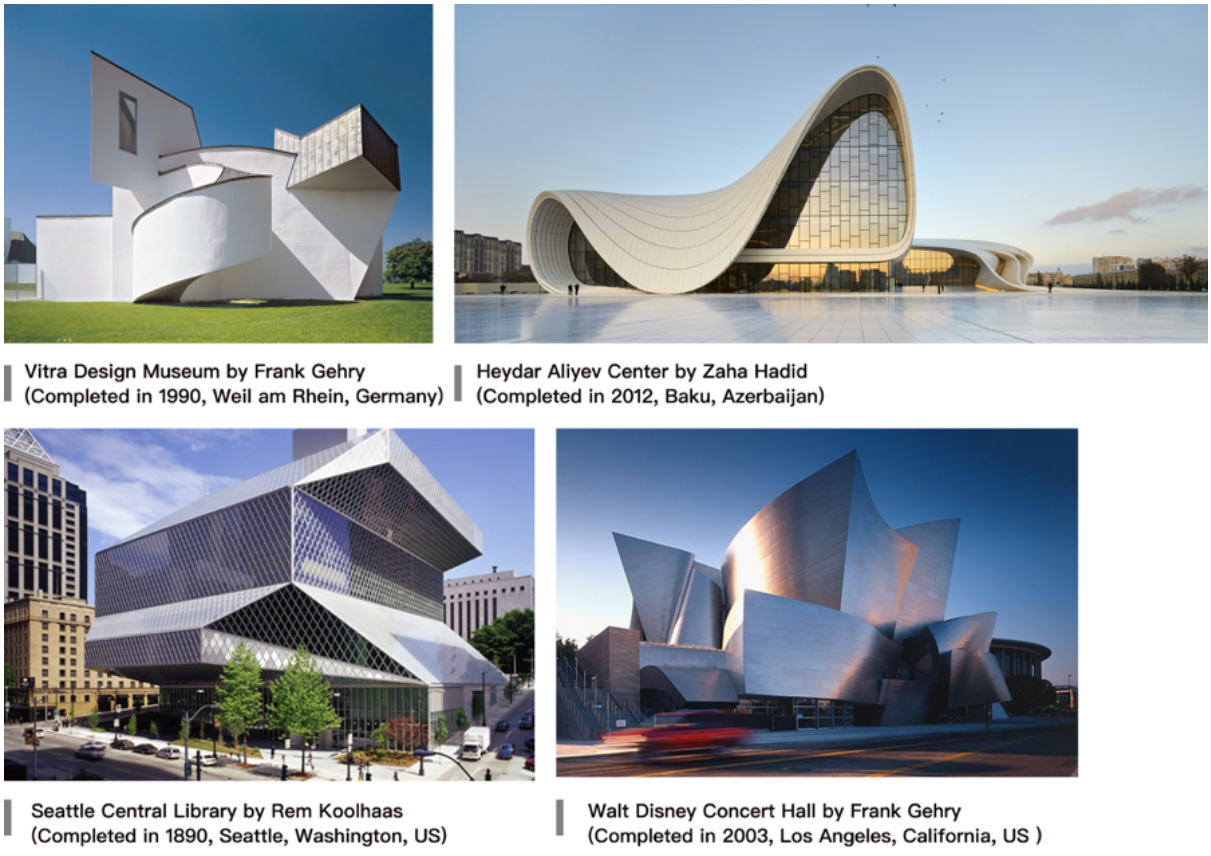


Figure 2.24: Deconstructivism

Deconstructivist architecture is characterized by surface manipulation, fragmentation, and non-rectilinear shapes which deform and dislocate architectural conventions concerning structure and envelope. It deliberately juxtaposes elements that appear to contradict each other in order to challenge traditional ideas of harmony, continuity and even stability. In short, deconstructivism challenges almost all traditional styles of building design ("Deconstructivism", n.d.).

2.6.4 Memphis Group (1981-88)

The Memphis Group was founded in Milan, Italy, by the Italian designer Ettore Sottsas in 1982. Memphis designed Postmodern furniture, fabrics, ceramics, glass, and metal objects from 1981 to 1988. The Memphis style is remarkable by its distinctive colorful design, and it is still popular thirty-three years later in the 21st century.

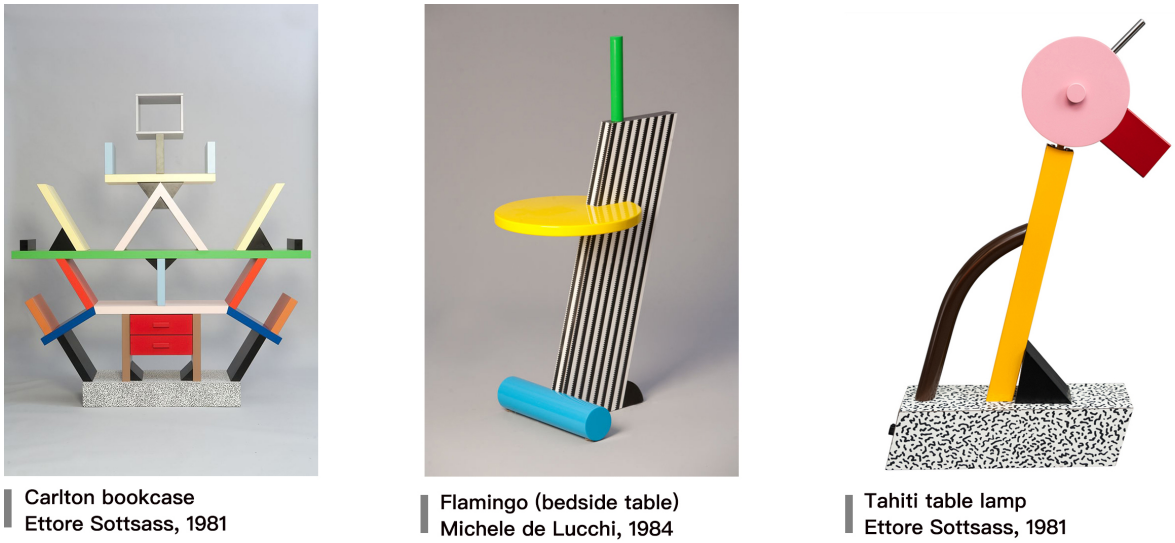


Figure 2.25: Representative Memphis Group's works

Memphis works within pre-established shapes, colors, styles or decorations. After decades of modernist doctrine, Sottsass and co-workers wished to get rid of the autarchy of smart but soulless "taste" in design, taught by the Bauhaus.

The solution was to continue with the experiments on unconventional materials, historical forms, kitsch motifs and murky colors initiated by Studio Alchymia, an Italian design group from the late 1970s, to which Sottsass and De Lucchi (designer) belonged (Carol, 2017).

Inspired by the Art Deco and Pop Art movements, the Memphis style began to form and encompassed the aesthetics of kitsch from the 1950s to the futuristic style of the 1970s. The work of the group was characterized by ephemeral design, use of vibrant colors contrasting with black, colored decoration, plastic laminates in furniture, asymmetrical and geometric shapes arranged randomly and exhibited in designs in an exotic way for the time, as well as prints that imitated leopard skin (Carol,2017).

Figure 2.26: The original 'Apple Watch', 1995

Sottsass became increasingly disillusioned with the media chaos around him, so he left the collective in 1985. Then, the Memphis style faded in the design world. Although created in the 1980s, colorful geometric aesthetics became more and more popular and widely accepted in the 1990s, where it had an impact on the design of furniture, architecture and household products. The original 'Apple Watch', created in 1995 as a freebie to the customer who bought the Mac System 7.5, was designed with a Memphis aesthetic (?, ?).

In the last decade, designers are adapting the style and introducing new colors, geometries or patterns to add contemporary interactions. Memphis is now being used as design inspiration, and even has become a philosophy and way of working. For the new generations, Sottsass made it possible for young designers to understand what emotional approach creates iconic design. (Zara, 2017)

> Memphis has regained its footing as a cultural force in the last ten years, resurfacing as the apparent inspiration for a 2011 Christian Dior runway collection and a seemingly endless supply of hip throw pillows, crop tops, and uncomfortable-looking chairs. In 2014, the former Memphis member Nathalie Du Pasquier was tapped to design an American Apparel collection and this year her work inspired a furniture collection for the US manufacturer West Elm. Alessandro Mendini, who contributed to the first Memphis show, designed a set of skateboards for the streetwear brand Supreme in 2016. Last November, Sothebys three-day auction of David Bowies Memphis collection made 1.3m ($1.68m), and BMW created a series of cars celebrating the group. (Zara, 2017, para.11)

2.7 Conclusion

The goal of this thesis is to develop a design guideline for helping a designer or company to create a distinctive, playful product that differentiate from the existing products in the general market. To utilize the knowledge of aesthetic, emotional design, design history and case studies could be the first step to develop the styling and modeling methodology. The coming chapter will discuss the styling and modeling methodology in detail.

Chapter 3

DESIGN GUIDELINES

3.1 Visual Focusing Points

This chapter will develop the design guidelines for a visually compelling product. To begin with, this thesis proposes a new terminology: visual focusing point. A visual focusing point (VFP for short) is the most visually appealing and interest-stimulating part of a product. This thesis assumes that a visually compelling product must have at least two VFPs. The more VFPs it has, the more visually compelling it is.

By analyzing design features of a selected design company, this thesis summarizes a table of design methods to help develop the guidelines for a visually compelling product. Later, the application of each method is counted as one VFP to help designers determine the product.

3.1.1 Studies on Design Methodology: Japanese Design Company Nendo

Nendo is a newer Japanese design studio founded by Japanese architect Oki Sato, with offices in both Tokyo and Milan. Nendo was formed in 2002, after an inspiring graduation trip to the Milan Design Furniture Fair, and has since become one of the most prolific design firms in the world. The studio's work centers around smart, simple concepts adapted to the design of furniture, installations, interiors, household products, art objects and even food products. Nendo aims to reconstitute the everyday by collecting and reshaping them into something that is easy to understand. The reason why Nendo is selected to be studied in this thesis is that the design principal of Nendo can be applied for designing visually compelling products.

The firm describes itself as follows:

> The concept of Nendo is: giving people a small "!" moment: There are so many small "!"moments hidden in our everyday. But we don't recognize them. Even when we do recognize them,we tend to unconsciously reset our minds and forget what we've seen. But we believe these small "!" moments are what make our days so interesting, so rich. That's why we want to reconstitute the everyday by collecting and reshaping them into something that's easy to understand. We'd like the people who've encountered Nendo's designs to feel these small "!" moments intuitively. That's Nendo's job (Nendo, 2002).

Nendo's "!" moment concept is all about small emotions. Every single design can bring us something new to refresh our minds. It is identical to the idea of visually compelling product. Oki said: "I believe that the way of thinking about the design of a small piece of chewing gum or a house should be the same. Although the process is technically completely different, I try to design both scales in a similar way. That explains why all our designs have something very Nendo-like. For me, the role of design is about solving things, about finding new solutions. Also, it is about what kind of story you can find behind the object, whether it's product or architecture. It is all the same to me" (Nendo, 2002).

This thesis analyzes the product line of Nendo, which reveals that its products follow certain methodology that all designers can apply.

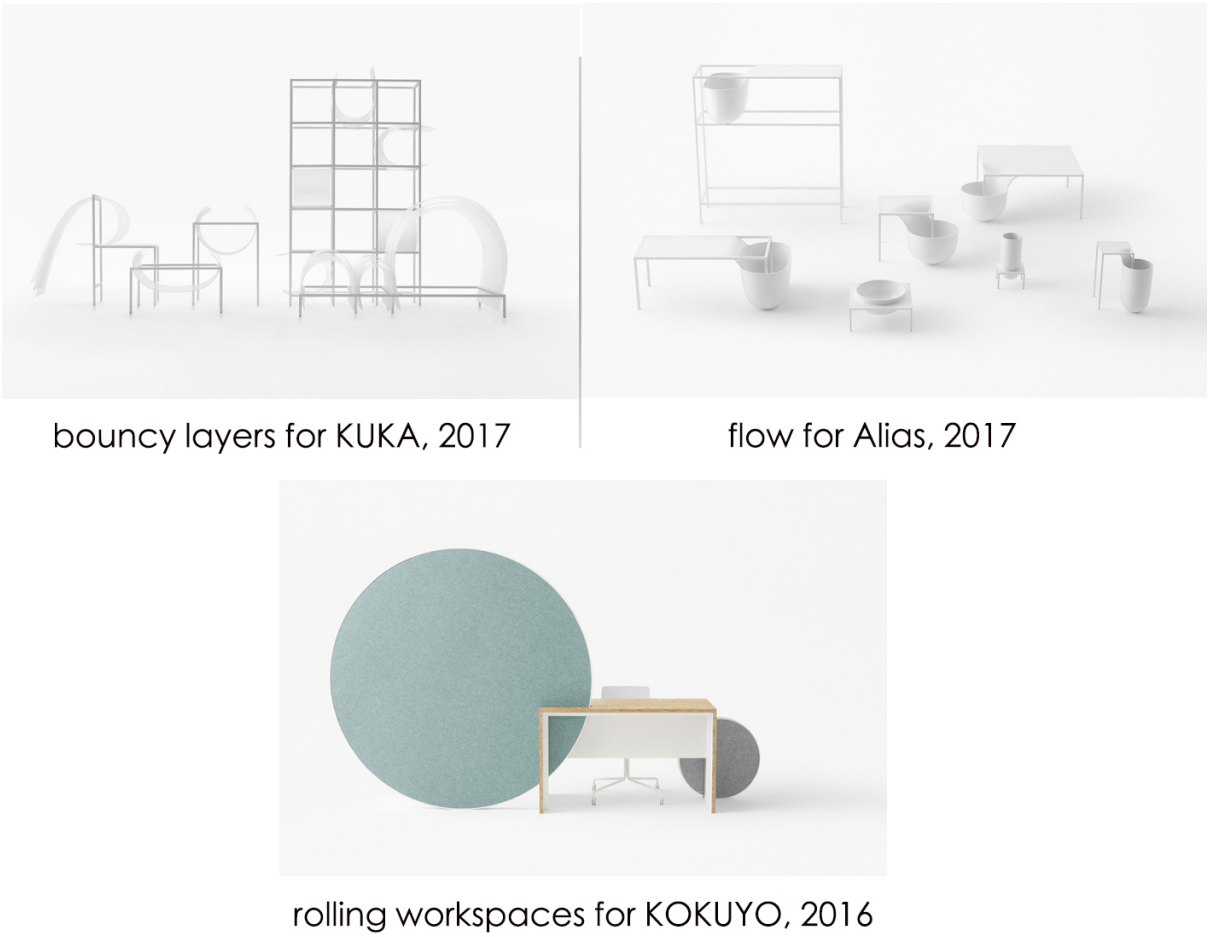


Figure 3.1: Nendo's projects that share the same design method, Group 1 (Nendo, 2015-2017)

For example, Figure 3.1 shows an example of Nendo's three projects sharing the same design method. These three groups of furniture all use simple geometric forms: surfaces defined by straight lines (rectangles) and curved surfaces (domes, curvy surfaces, or round surfaces). They all are a combination of curve and straight forms. The visual comparison of curve and straight forms stimulate people's interest to look and use the product, which makes the products stand out from others in the current market. People get used to furniture that uses single forms (such as a rectangular table or a round table), while the new combination appears fresh in their minds.

Figure 3.2: Nendo's projects that share the same design method, Group 2 (Nendo, 2015-2017)

In addition, Figure 3.2 shows another example of Nendo's three projects sharing the same design method. All the three groups of product above cut a certain portion out of the basic form(such as a cube or a basic chair) and leave it hollow or empty to create a new structure of the product. The chair "float for Moroso, 2015" conveys a visual impact of lacking support of two legs by detaching two legs. In the same way, the set "twig for Alias, 2015" also plays the same trick by detaching the arms of the chairs. The "cubic pet goods by — n, 2016" utilizes the hollow space by cutting a small cube out of a big cube, to provide a space for the pet to sit in.

sticker-calendar for by | n, 2015

sunset for by | n, 2016

Figure 3.3: Nendo's projects that share the same design method, Group 3 (Nendo, 2015-2017)

For those products that share the character of changing themselves due to the time of use, Nendo's works also share similar methodology.

Figure 3.3 are two products by Nendo. The one to the left is a calendar with daily peelaway stickers. Peeling away one sticker each day gradually reveals the scenery of the following season decorating the page, allowing you to feel the gradational changing of the seasons as each fades into the next. Twists like these are interspersed throughout and making peeling away the stickers fun. The design breathes new life into the sticker backing, which would normally serve no purpose but to hold the stickers (Nendo, 2015). The product to the right is the design of a candle. It appears to be a normal white candle. But once lit, the center of the candle begins to change colors as it burns: first to yellow, then orange, red, purple, and finally to blue. These colors reflect faintly off of the white wax surrounding the flame. The transition of colors is inspired by the shifting shades of light that paint the sunset sky. Each color has its own accompanying scent: bergamot, lemon grass, sweet marjoram, lavender, and geranium. Not only does the candle provide illumination, but the transition of colors also serves as a reminder of the passage of time (Nendo, 2015). For these two projects, adding slightly different change during the process of use can arose users' emotional variety. It makes the design smart and cute.

For designers, Nendo's design method is, no doubt, worth observing. It is helpful for designing a visually compelling product step by step. Although sometimes the ability to use imagination is hard to assess, guidelines can help in exploring the range of creativity.

This thesis states two tables below (Figure 3.1and Figure 3.2) to show the design methods of form of Nendo with examples. They are:

- Detach: cut a certain portion out from a basic form and leave it hollow or empty.
- Segment: to divide the basic form delicately into parts
- Extrude: to push or force a certain shape by a certain height
- Extrude and segment: divide a strip form into several slices
- Combination of curve and straight form: to combine a curvy form with a straight form
- Concentrically align: the features of or denoting circles, arcs, or other shapes that share the same center
- Gradual change: form changing, moving etc.,slowly by certain degrees
- Tilt: to move straight form into sloping position
- Imitate: copy object A's form to object B(from a totally different category)
- Attach: attach object A to object B by entwining or twisting like human action

See the definition, effect and examples through Table 3.1 and 3.2.

Note: basic forms include all the common geometric figures such as cube, rectangular solid, globe, cylinder, circular cone, etc.

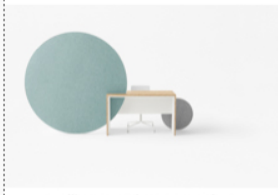
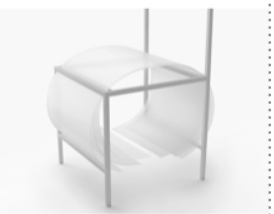
Method	Definition	Effect	Representative Project 1	Representative Project 2	Details
Detach	cut a certain portion out and leave it hollow or empty	to utilize the hollow space or visually lack of some portion	twig for Alias, 2015	cubic pet goods for by | n, 2016	twig for Alias, 2015
Segment	to divide the basic form delicately into parts	to give surprise when using the product	seven sliding cases for Blanc Bijou, 2018	rassen for for Hashikura Matsukan by | n meister, 2013	seven sliding cases for Blanc Bijou, 2018
Extrude	to push or force a certain shape by a certain height	the top view stimulate interest or upgrade the function	hanabata for by | n, 2013		hanabata for by | n, 2013
Extrude + Segment	divide a strip form into several slices	bring interest when in use	slice of time for OFFICINE PANERAI, 2017		slice of time for OFFICINE PANERAI, 2017
Combi-nation of Curve and Stright form	to combine a curvy form with a straight form	visually compari-son stimulate interest	 rolling workspaces for KOKUYO, 2016	bouncy layers for KUKA, 2017	 bouncy layers for KUKA, 2017

Table 3.1: The basic design method of form of Nendo - 1

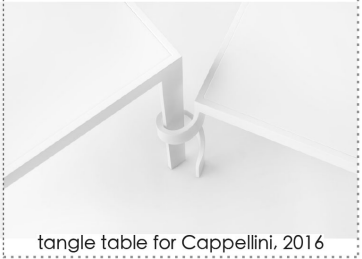
Method	Definition	Effect	Representative Project	Details
concentric -ally align	the features of or denoting circles, arcs, or other shapes that share the same center	visual orderliness stimulate interest	trace container for Collective Design, 2016	trace container for Collective Design, 2016
gradual change	form changing, moving, etc., slowly by certain degrees	visual orderliness stimulate interest	bunaco-speaker for bunaco, 2018	bunaco-speaker for bunaco, 2018
tilt	to move straight form into a sloping position	visually unbalance stimulate interest	nod for Marsotto edizioni, 2016	nod for Marsotto edizioni, 2016
Imitate	copy object A's form to object B(from totally different category)	discrepancy bring interest when in use	neyuki for flanders, 2018	neyuki for flanders, 2018
Attach	attach object A to object B by entwining or twisting like human action	bring emotional touch	tangle table for Cappellini, 2016	 tangle table for Cappellini, 2016

Table 3.2: The basic design method of form of Nendo - 2

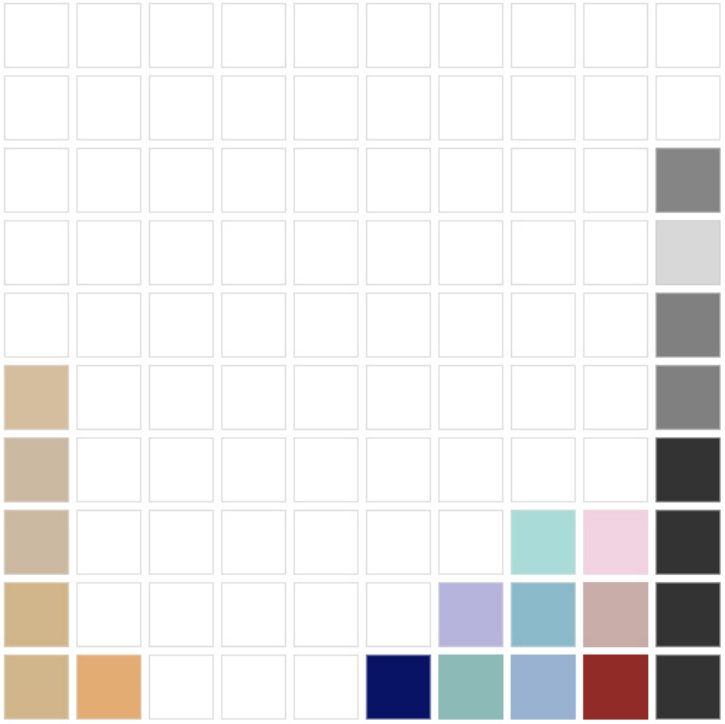


Figure 3.4: The color palette of Nendo

Nendo's color palette is simple and clean. Figure 3.4 shows the colors of 100 products of Nendo provided by this thesis from random selection. As can be seen in the figure, the majority of them are white, while 8% of them are black or grayish color. In conclusion, Nendo likes to use neutral colors and colors of low saturability. Neutral colors such as white, beige, brown or black convey a feeling of peace and tranquility, which perfectly match the style of Nendo. Neutral color can also match any form of product and do not distort the original aesthetic sensuality (See more about color in the section of Color Theory).

3.2 Guidelines for Visually Compelling Product

This study will start with a flowchart for the design procedure. The checklist of the form development is based on the content from the literature review and studies on Design Methodology of Japanese Design Company Nendo.

3.2.1 Design Procedure

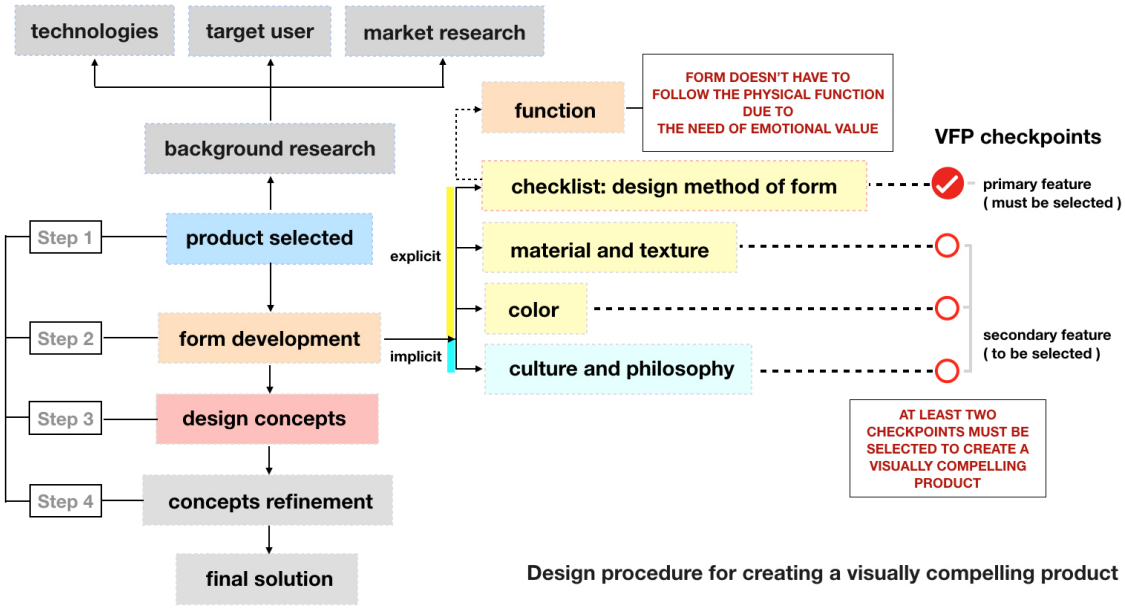


Figure 3.5: Design procedure for designing a visually compelling product

Figure 3.5 is the design procedure for creating a visually compelling product. Before the product is selected, designers should conduct a series of background research including technologies, target user, and market research to find out the design opportunities. After that, designers may start the procedure of form development.

To design a visually compelling product, form development is the point with which to start. Visual focusing points exist in the appearance of a product while the form mainly defines the appearance. Hence, form development is the core task during the whole design procedure.

As shown in Figure 3.5, there are 5 VFP checkpoints in the design procedure:

- Form (provided with a checklist of design method of form)
- Material and Texture
- Color
- Culture and Philosophy

Form, material, texture and color are explicit features, while culture and psychology are implicit. To design a visually compelling product, the form is the primary feature and must be selected. Material, texture, color, culture and psychology are considered after the form development as secondary features since these four features will be reflected by the form. The more checks are selected, the more visually compelling is the product. It is recommended that at least two checkpoints should be selected to make sure the visual impact is enough to create a visually compelling product.

3.2.2 Form Does Not Have to Always Follow the Physical Function

As can be seen in the Figure 3.5, the relationship between form and function is interactive. In this thesis, it is important to point out that form does not always have to follow the physical function. As can be seen from the case studies of the legendary lemon squeezer 'Juicy Salif' and MINI Cooper, their forms bring enough emotional values so that their function is less important when people making decision to purchase. To some extent, form, material and color are the first priority when considering a product as visually compelling.

3.2.3 Design Technic of Form

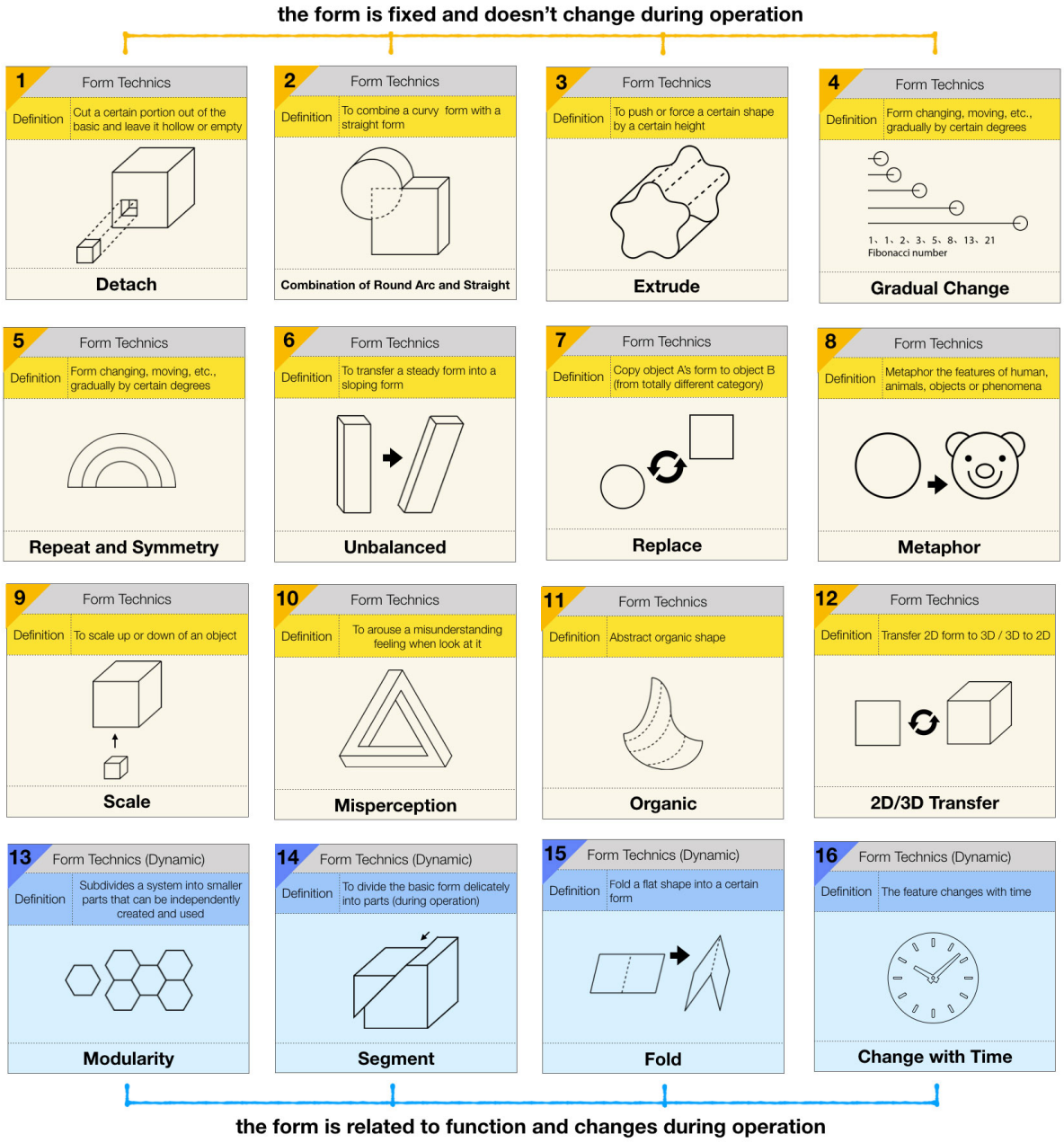


Figure 3.6: Design technic of form

After reviewing the majority of existing products in the market, Figure 3.6 is a summary of design technics of form, including the ones collected from the study of Nendo and some technics used in recent decade. There are 16 technics of form collected in the form, each of them is

displayed as a single card. Designers can pick one technics card to apply to their design. Some technics can be applied together as a combination.

Next, each technic will be demonstrated by existing products.

Detach

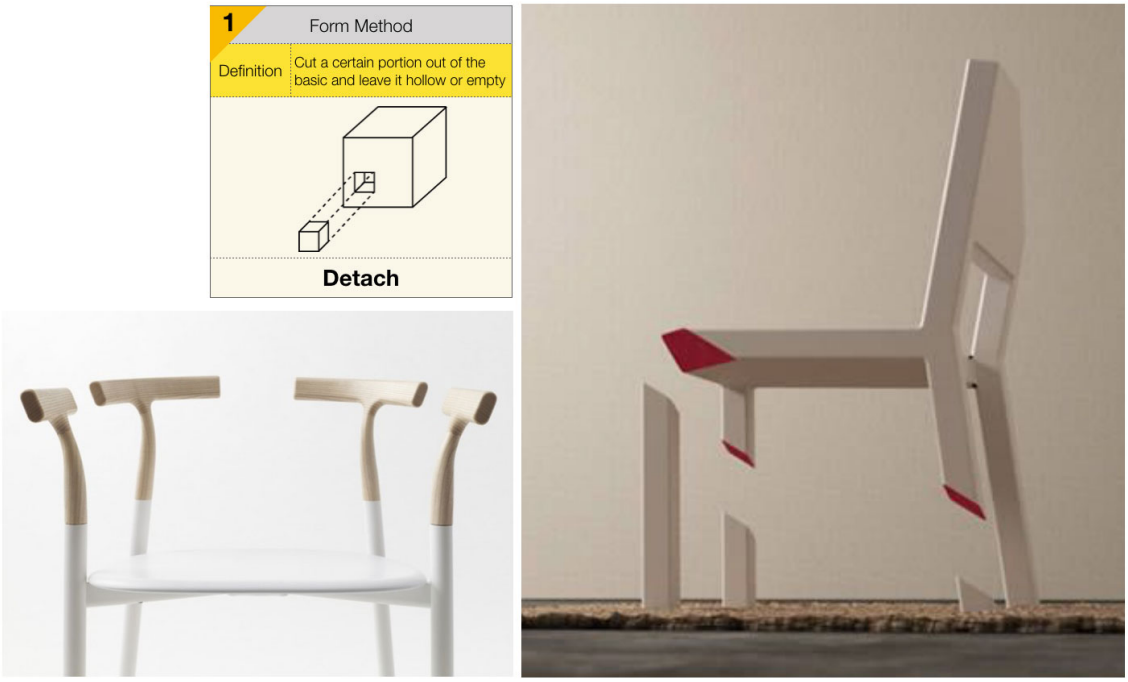


Figure 3.7: Design technic of form - detach

Detach means disengage (something or part of something) and remove it.(Definition of Detach in English, 2018) Cutting a certain portion out of the basic and leaving it hollow or empty can bring a feeling of visual impact. As has discussed in this study before, Nendo uses this method several times during the past years. The *Cut Chair* by Peter Bristol (2011) creates an optical illusion by detaching three legs. A plate concealed by a thick carpet allows a robust cantilevered seat. Three well placed leg stumps and the chair looks as though it has been sliced apart magically (Bristol, 2011).

Combination of Round Arc and Straight

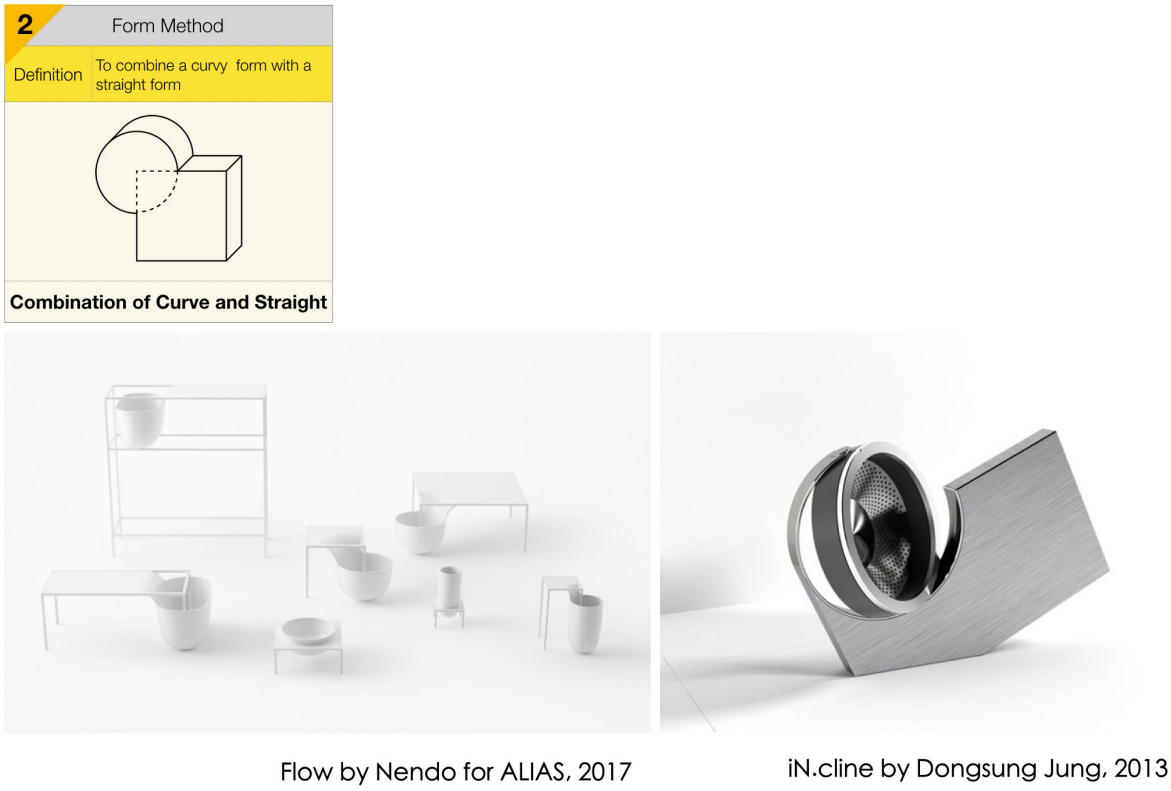


Figure 3.8: Design technic of form - combination of curve and straight

Combinations of round arc and straight forms have been widely applied since the Memphis Group in the late 80s. Curved lines are softer compared to straight lines. They sweep and turn gracefully between end points. Curved lines are less definite and predictable than straight lines. They bend and change direction. Curved lines express fluid movement and can deliver multiple emotions. They can be calm or dynamic depending on how much they curve (Bradley, 2010).

Flow is a series of tables that hold something on top and containers to hold something within. In each design, a part of the tabletop appear to melt away and form a container below, as if it were completely oblivious to the tables frame structure (Nendo, 2017). The enigmatic pieces of furniture achieve a fluid fusion of functionality serving to hold something either on top or within, which make it compelling on both visual domain and functional domain.

iN.cline is a sculptural audio object that is as functional as it is funky. The playful form allows the consumer to rotate the single directional speaker a full 360° (Turner, 2013).

Extrude

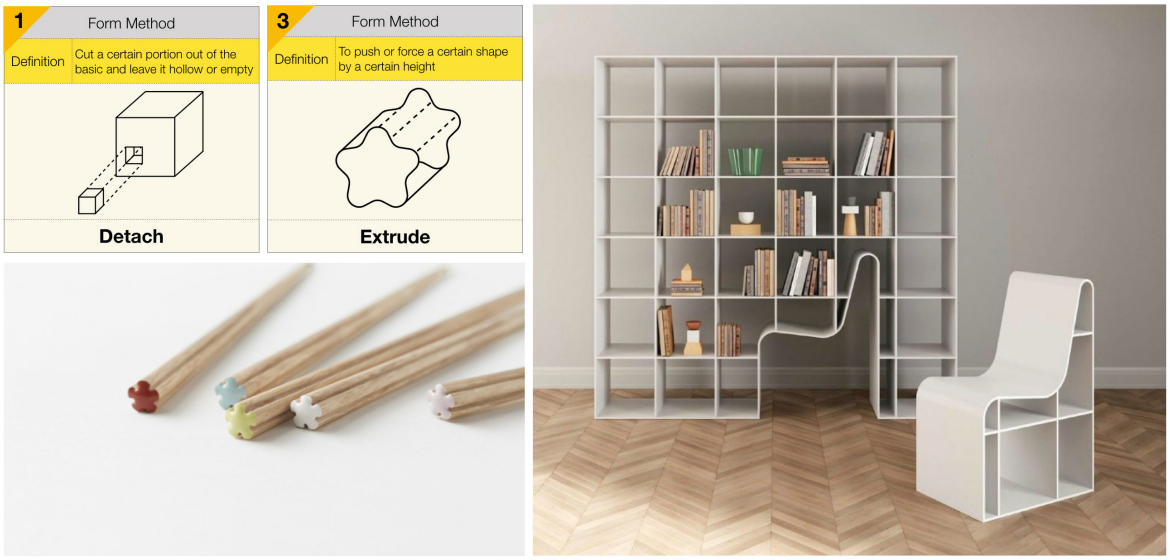


Figure 3.9: Design technic of form - detach and extrude

Extrude is to shape (a material such as metal or plastic) by forcing it through a die (Oxford-Dictionaries, n.d.). The form of extruded pieces are convenient to produce, and can make the design more visually compelling.

Round chopsticks are slippery to use, but overly square-cornered ones arent as comfortable to hold. Nendo explored ways of increasing the surface area of chopsticks in the hand, as a way of improving holding comfort, and discovered the natural form of the pleated cross-section. When viewed as a cross-section, the chopsticks look like flowers, so a bunch of chopsticks kept together into a cup turns into a bouquet. (Nendo, 2013). This design demonstrates Combing Extrude and Metaphor.

Chair by Sou Fujimoto (2017) demonstrates how to combine Detach and Extrude. The form of chair is made by “Extrude”, and the way the chair combines with the shelf is “Detach”. The unique form of the shelf is visually compelling due to the hollow space cut out by the chair.

Gradual Change, Repeat and symmetry, Fold

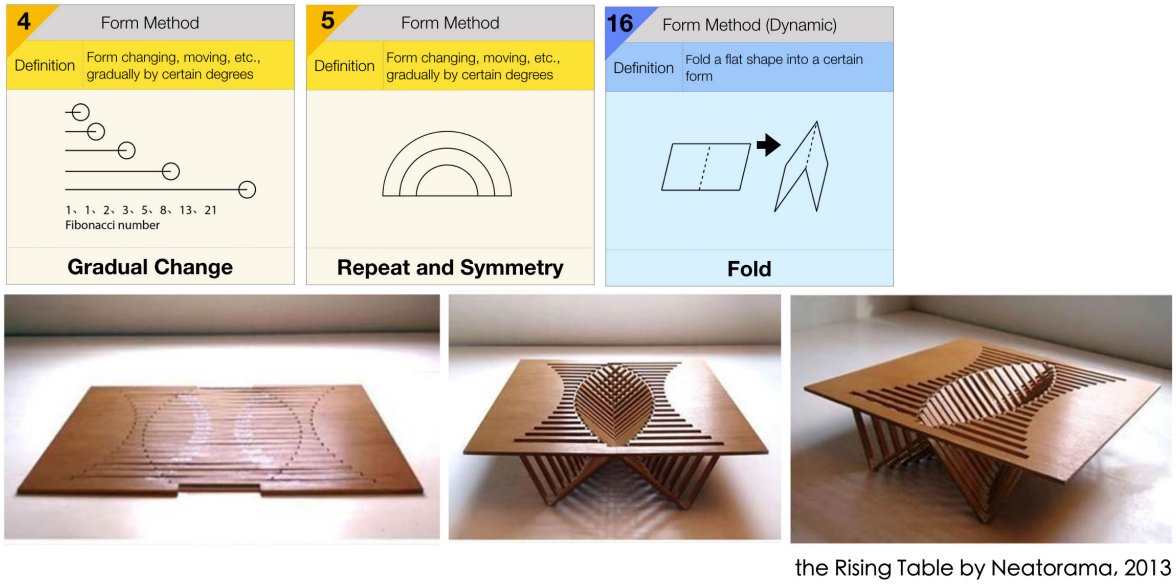


Figure 3.10: Design technic of form - fold

Gradual Change, Repeat and Symmetry, Fold strategies can be a powerful design tool to punctuate an otherwise orderly, boring design. Designs that need more stability, a strong organizational structure, and a classic and trusting message, tend to use more symmetry in the design (WebpageFX, n.d.).

Rising table is created by architectural designer Robert Van Embricqs, which is made from a single piece of wood (Embricqs, 2013). The Rising Table is part of the graduate change, repeat and symmetry furniture formula. According to the designer, the concept inspired the incision pattern in the flat surface of the wood that resulted in the creation of a latticework of woven bamboo beams that make up the center of the table. By emphasizing natures logic, a seemingly random collection of bamboo beams organically merges to form the figuratively beating heart of the Rising Table (Embricqs, 2013).

Unbalanced

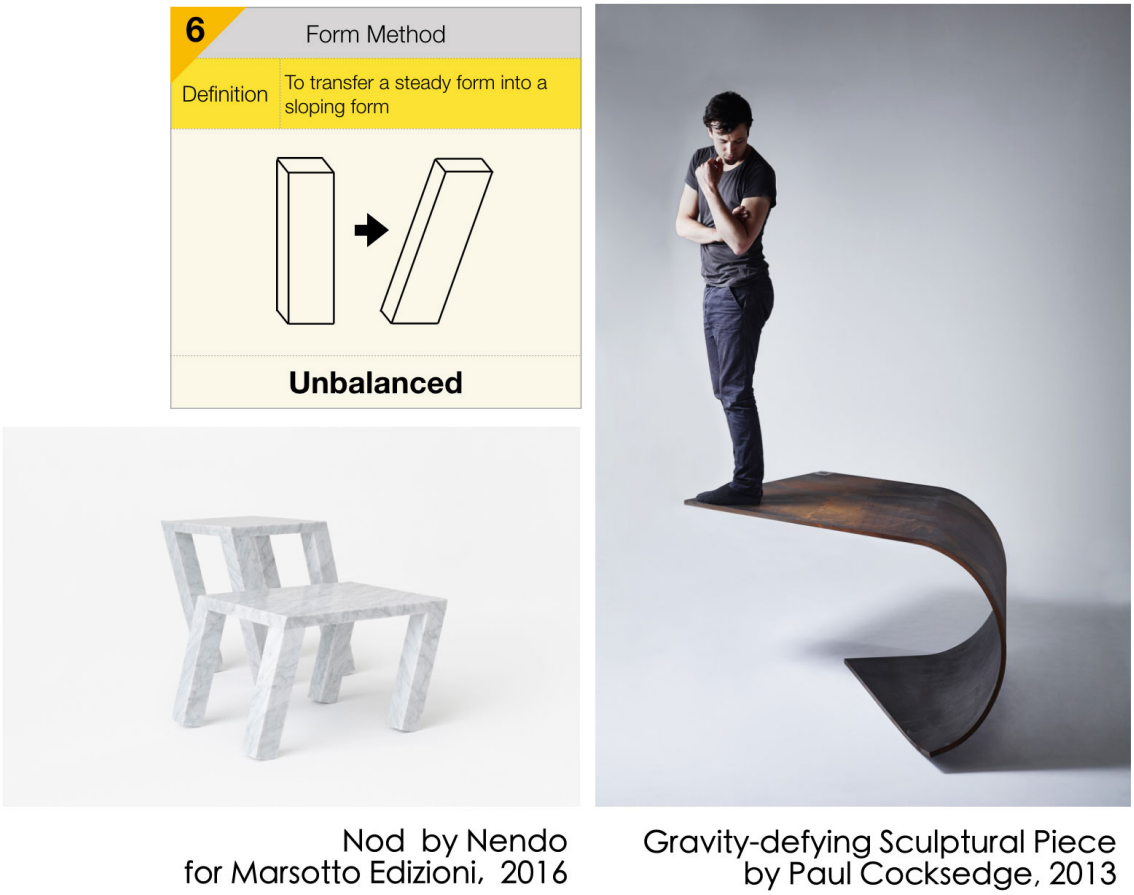


Figure 3.11: Design technic of Form - unbalanced

Unbalance means to put out of balance (Merriam-Webster, n.d.-c). This two demonstrations both utilize the characteristic of materials. Nendo (2016) designed a side table for Marsotto edizioni, an Italian brand specializing in marble furniture. The weight of marble is often perceived as a negative factor, but in this case this element has been actively exploited, resulting in the creation of a table that is tilted to one side. The table is precisely stable due to the weight of the leg section and its appearance of instability in turn provides a new expression of agility to the marble, while London-based designer Paul Cocksedge in 2013 designed a gravity-defying sculptural piece that has caught the eyes. The poised table may seem like a physical impossibility, but, due to very careful mathematical calculations, this 1,000-pound table is entirely

stable. The rolled steel design is actually so solid that you can stand on the overhanging edge without falling over.

Replace

Figure 3.12: Design technic of Form - replace

This thesis proposes that "Replace" means to take the place of object A's physical form instead of object B's physical form, and Object A and B are from different category. This method is often used in designing creative gifts. The bottle-shaped light and the camera lens cup are classical examples (as shown in Figure 3.12). According to the studies in Chapter 2, customers with special interests are in need of specific personalized designs to meet their emotional needs and express personality. Designers can take this method as a way of brainstorming to exercise in creativity.

Metaphor and Scale

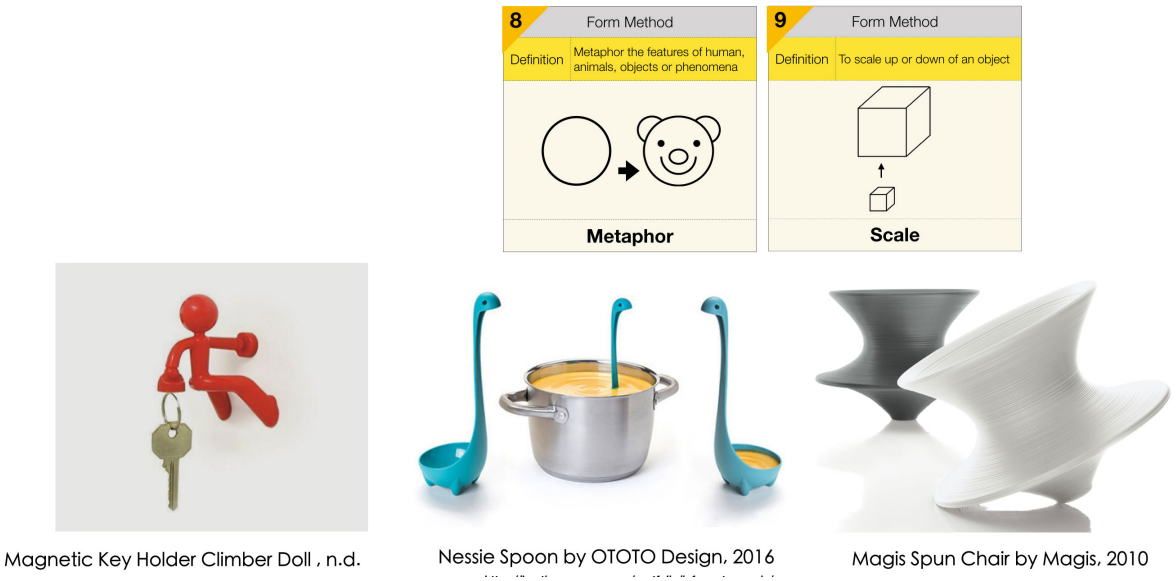


Figure 3.13: Design technic of Form - metaphor and scale

Metaphor means an object, activity, or idea that is used as a symbol of something else (Merriam-Webster, n.d.-d). In the field of industrial design, “Metaphor” is often combined with “Scale”. Scale means to scale up or down the original object to translate into a new one. The *Magis Spun Chair* by Magis (Heatherwick, n.d.) is a scaled-up form of a spinning top. By scaling up a toy of small size, the chair is more interesting to look at. It combines architecture, design, and sculpture into one innovative piece.

Everything looks cute when small (Rowley, 2010). There are multiple products that created by scaling down an object. For example, people would like to buy a small human-figure key holder as a functional decoration, and a soup ladle looks like the Loch Ness Monster is also fun to either look or use (as shown in Figure 3.13). Studies have shown that brains want to give cute things extra attention over non-cute things. So it makes sense that these characteristically cute features show up in marketing a lot (Brainson, 2016).

Misperception

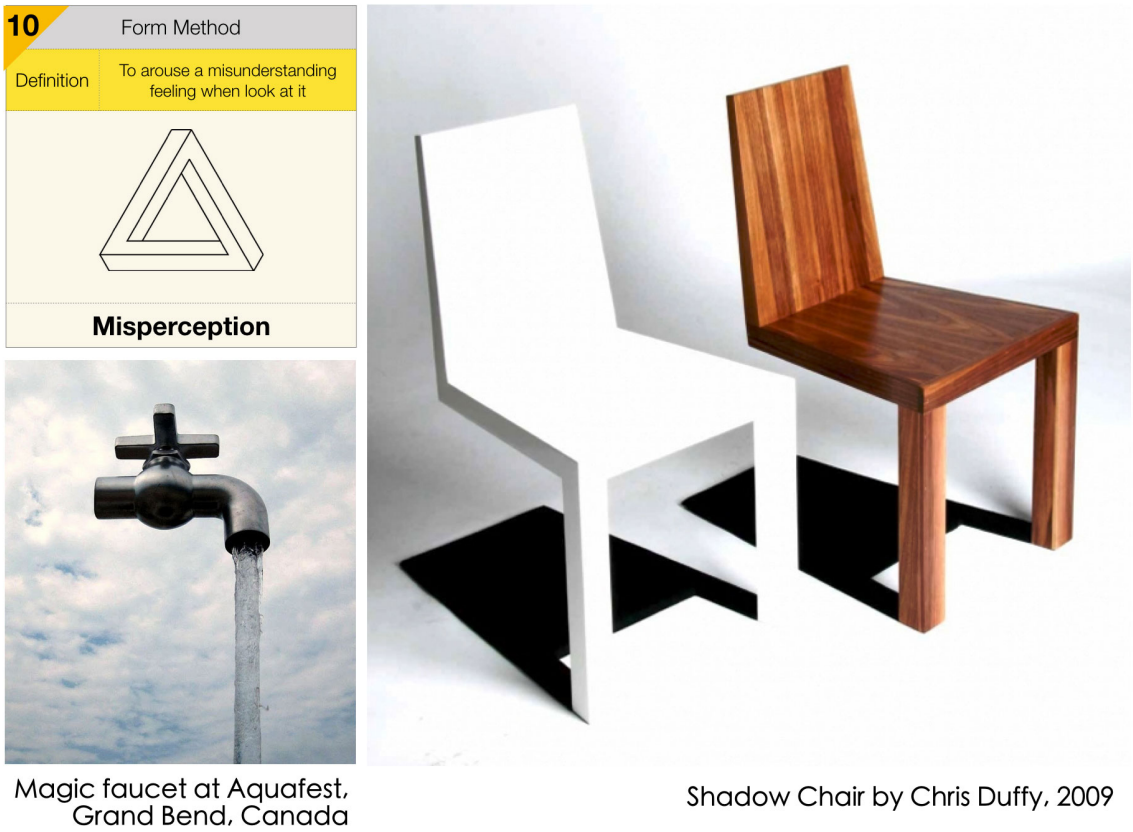


Figure 3.14: Design technic of Form - misperception

Misperception is a false or inaccurate perception (Merriam-Webster, n.d.-a). There are many different types of Illusions, and they all deliver a sense of wonder, that momentary buzz of coming face-to-face with the bizarre. They are also humbling, in a way, reminding people of their subjectivity and the limitations of perceptions, and ability to see the truth. It is only through intellectual rigor and scientific understanding that one can fully transcend them and by doing so, get a better sense of how vision and brain works (Perry, 2017).

In the real world, Misperception is often used in art and sculpture. The *Magic faucet* (Figure 3.14) is a representative temporary art piece. It consists of a faucet mysteriously hovering above a pool or basin with an endless supply of water gushing out of it from seemingly nowhere. The faucet remains surprisingly steady despite having no visible support. This spectacular effect is achieved by a transparent tube in the middle of the water column that holds the

tap in place and keeps feeding it with water pumped from below at the same time. The water goes up through the tube and exits at the top. The water column, which is usually turbulent, effectively hides the tube from view. Several giant floating tap fountains can be found in other parts of the world (Kaushik, 2012).

Modularity

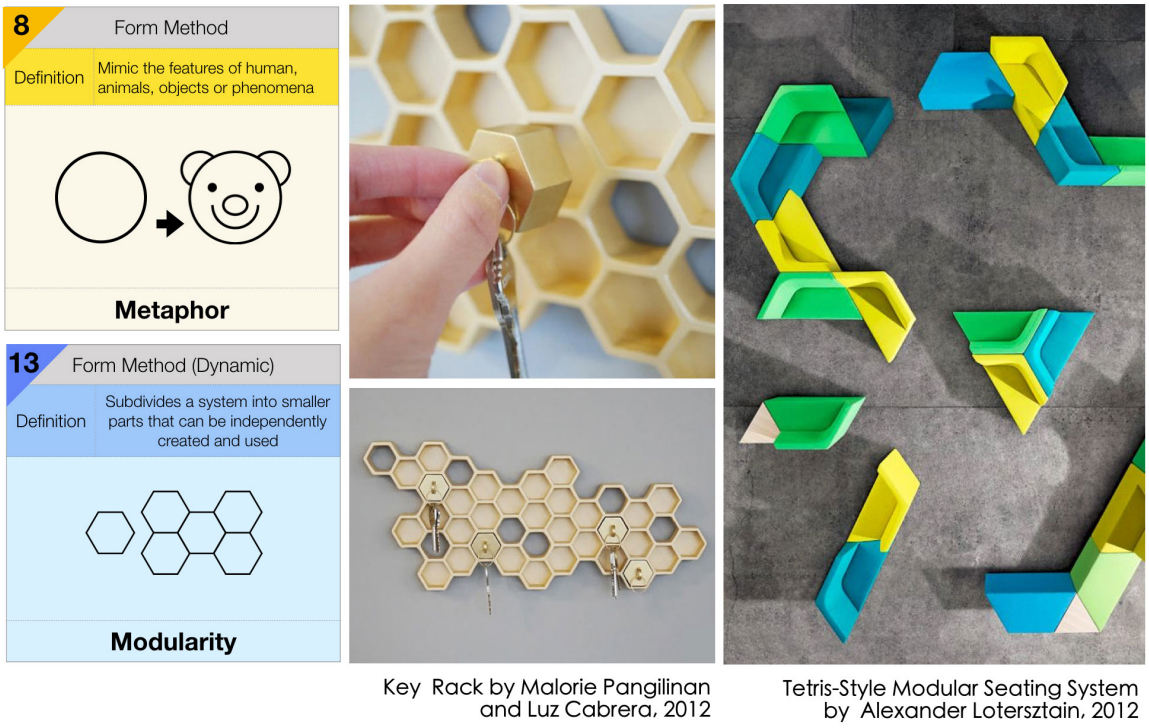


Figure 3.15: Design technic of Form - metaphor and modularity

Modular design, or ”modularity in design”, is a design approach that subdivides a system into smaller parts called modules or skids, that can be independently created and then used in multiple systems (Wikipedia, n.d.-b). The difference between “Modular design” and “Repeat” is that the modules each have physical function while the form with repeating parts does not have to have an actual function.

As can be seen in Figure 3.15, the *Tetris-style modular seating system* is a classical example of modular design. The colorful set of angled seating elements can be deployed and group together into multiple function.

In addition, the *Key rack* is a demonstration of combining “Metaphor” and “Modularity”. The form is a metaphor of the bee hive. The concept behind the project comes from the iconic 1950’s phrase, ”Honey, I’m Home” which drew images of the American Dream and being able to come home after a long day to beloved ones. Home is the place people return to, and that home belongs to people when they receive that shiny new set of keys. But, even keys need a place to return to. The key holder not only brings emotional touch but also doubles as an elegant wall piece.

Organic

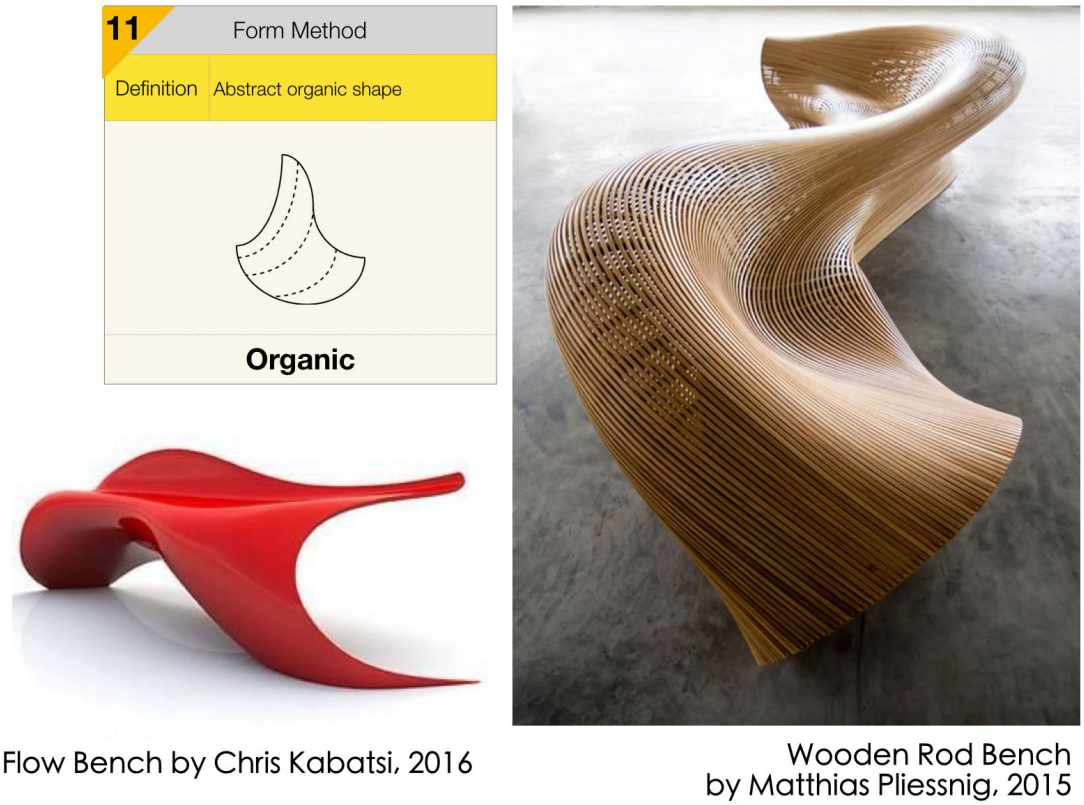


Figure 3.16: Design technic of Form - organic

Organic shapes are defined by not being regulated by patterns or exact dimensions in their angles, curves, or lengths of lines. They convey the aesthetics of randomness and freedom. Most times, designers can draw these shapes without using any equipment besides hands and pens or pencils (Moulton, 2016). Organic shapes are free-form, unpredictable and flowing

in appearance. These shapes, as well as organic forms, visually suggest the natural world. The addition of organic forms to a composition dominated by geometric structures can add unpredictable energy (“Shape and form”, n.d.).

Parametric Design

Figure 3.17: Parametric design

Parametric design is a process based on algorithmic thinking that enables the expression of parameters and rules that, together, define, encode and clarify the design concept (Jabi, 2013). The term parametric originates from mathematics (parametric equation) and refers to the use of certain parameters or variables that can be edited to manipulate or alter the end result of an equation or system. While today the term is used in reference to computational design systems, there are precedents for these modern systems in the works of architects such as Antoni Gaudi, who used analog models to explore design space (Frazer, 2016).

2D and 3D transfer

Figure 3.18: Design technic of Form - 2D/3D transfer

The 2D and 3D transfer design method makes the form of the designed object looks more brief or specific. The Figure 3.18 shows two representative works of 2D and 3D transfer works. For example, the Napa Lamp is designed by a product and lighting designer, Giles Godwin-Brown. The Nepa Lamp is a two-dimensional lamp silhouette that stands six feet. Its wall-mounted and equipped with friction hinges to allow the piece to pivot away from the wall. The Candor Lamp is also wall-mounted and is constructed of cotton and timber. Wired with LED lighting as well, this lamp features a transparent strip that generates a halo-like glow on the wall it is mounted on (Brown, 2012). The vessels are designed by Maya Selway in 2014, who won British designer Maya Selway second prize in the Object category of the Interieur Design Awards at the Interieur design biennale in Kortrijk, Belgium. Her works show the objects that seem like half-finished sketches of candle holders, vases, bowls and bottles (Selway, 2014).

Segment

Figure 3.19: Design technic of Form - segment

Segment is to divide the basic form delicately into parts during operation. This form design method is related to function, since it divides the initial form in to parts within function. The Figure 3.19 shows two representative works of the “Segment”. For example, *Spoon plus* is a concept by product designer Aissa Logerot (2014) where she designed a spoon and chopsticks as one. *Spoon plus* is a chopstick and spoon hybrid that forms a pair of chopsticks with a small dish for sauce when taken apart. Designer Alessio Romano designed a pair of scissors that are hidden as a decorative object.The scissors are built on two simple and archaic forms, a cone and a circle, joining the two bring to life a mysterious-looking and iconic object. The circle in the upper part helps the user to grab the scissor ensuring excellent ergonomic design; the base protects the inside metal part and allows the perfect stability (Romano, 2015).

Change with Time/Capacity

Figure 3.20: Design technic of Form - change with time or capacity

Change with time and capacity design concept makes the capacity and time change to be visible and reflective. As Figure 3.20 shows, many designs use this method. For examples, Miyama Minoyaki used the capacity change concept and designed the *Haas soy plate*. The plate has four layers, and the volumes of each layer are 5ml, 12ml and 30ml. The layers make the plate both aesthetic and practical. The candle called *Sunset* was designed by Nendo. It appears to be a normal white candle. But once lit, the center of the candle begins to change colors and scents as it burns. The colors reflect faintly off of the white wax surrounding the flame. The transition of colors is inspired by the shifting shades of light that paint the sunset sky. Not only does the candle provide illumination, but the transition of colors also serves as a reminder of the passage of time. The time lamp was designed by Jet Wang in 2008; users can see the time more directly through this lamp. A simple function combination design of clock and light will make lighting more fun.

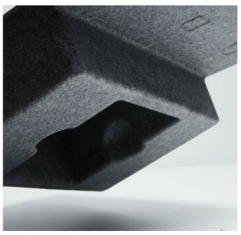
3.2.4 Material and Texture

Different materials have different features. Material utilization is a way to put concept into practice. Thus, analyzing the features of materials is important. Texture is the visual or tactile surface characteristics and appearance of something (Merriam-Webster, n.d.-b). To design a visually compelling product, the selection of material and texture can affect the performance of the form.

A driving force behind innovation in all areas of design and technology is the development of new materials (Aschim, 2014). This thesis suggests designers attempt to use new materials to avoid aesthetic fatigue, bring new experience to users. Material ConneXion, founded in 1997 in New York City, is a materials consultancy that helps companies source advanced materials to enhance the performance, aesthetics and sustainability of their projects ("Material ConneXion", n.d.). The following table shows a handful of the cutting-edge materials as of 2016 thought by the company that would be important to designers over the next few years. All of these materials are available now but not yet commonplace; thus they are listed here for designers as reference. Due to the limitation of time and energy, all the valuable new materials cannot be included in this thesis.

Graphene Nanocoating

One hundred times stronger than steel, amazingly light, nearly transparent, and capable of efficient heat and electrical conductivity, graphene has applications in solar power, electronics, biomedicine, and more. But it's a relatively difficult material to work with and mass-manufacture in its purest forms. Graphene nanocoating allows other materials to be coated with the material, giving them most of graphene's best qualities cheaply and efficiently.

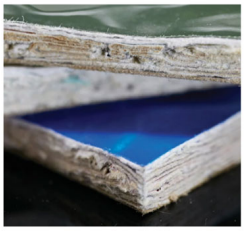


Karta-Pack (Cotton Fiber)

This 100% post-consumer material, which has the feel of cotton but the rigidity of plastic, is made from recycled cotton fibers, sourced from the likes of discarded jeans and T-shirts. In addition to helping recycle millions of articles of clothing per year, Karta-Pack feels fairly luxurious, making it an interesting choice for high-end packaging. Imagine unpackaging a gadget from what feels like rigid cotton.

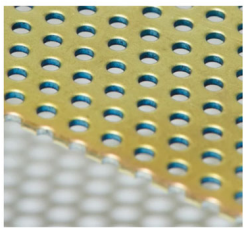
Colored Conductive Inks

Although inks that can conduct electricity have exist for years, these inks only come in two colors: silver and carbon. It gives conductive inks an aesthetic, that has no real beauty for non-engineers. A new breakthrough, however, has finally made it possible for conductive inks to come in any color as want. One potential use is in smart clothing and wearables.



ReWall Ceiling Tiles

ReWall Ceiling Tiles are made from recycled beverage containers – a mixture of cardboard, plastic bottles, and aluminum – using a method similar to the way oriented strand board, a construction-industry staple, is made. The result is a material that has the same structural integrity as strand board and can be cut and screwed into like wood, but which has much better resistance to moisture, so it can be used as a ceiling tile. It can also be exposed to the elements.



ZrOC

The process of coating most decorative metal items, like sinks or hubcaps, for improved hardness and scratched resistance is called physical vapor deposition, or PVD. ZrOC is a new coating technique in which a mixture of zirconium, oxygen, and carbon can be deposited on metal, plastic, wood, glass, or textiles. Depending on how those elements are mixed, customers can get chrome in any color, as opposed to the stock reflective silver.

Tethonite

3D-printed objects always look and feel inferior to objects made with traditional manufacturing processes and materials. While Tethonite is a 3D-printed ceramic compound that, when fired and cured, looks identical to ceramic made by hand or industrial machines. Not only could Tethonite push the boundaries of the ceramic arts by making increasingly intricate designs possible; it also potentially has wide-ranging consumer applications. Tethonite could let companies like Apple intimately combine the best qualities of metal and ceramics to create resilient new devices.

ThermalTech

A patented lightweight smart fabric made of 100% stainless steel mesh that is coated with a solar selective coating, ThermalTech could be a boon to makers of athletic gear. The fabric excels at absorbing heat in the form of ultraviolet light, then dispersing it throughout the entire material to dissipate. Companies like NIKE have already figured out materials to eliminate odors and sweats. Temperature regulation is the next.

Paptic

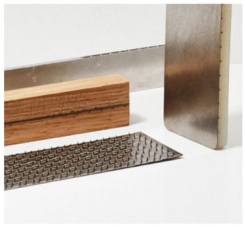
Blurring the line between paper and plastic, Paptic is a new material that is easy to print on, easy to recycle, and perfect for packaging. While it feels and looks like paper, it's as strong and tear-proof as plastic.

RE>CRETE

Concrete is a composite that is basically made up of a bunch of junk – mostly sand and gravel – bonded together with cement. Instead of using sand and gravel, RE>CRETE contains shredded newspaper and junk mail, ground up packing Styrofoam, home electronics wire, credit cards and CDs, salvaged house paint, dryer lint, Portland cement, and fly ash. It is basically construction scale recycling: With RE>CRETE, tomorrow's buildings will be built with today's trash.

Flexible Battery

Imagine wearing an entire suit that was just one big lithium-ion battery. Jenax Inc. Flexible Battery could make that possible. While normal batteries come in solid pieces, this battery is spun from fibers which make it more flexible. Flexible Batteries can apparently be flexed a couple of thousand times without affecting their performance, making them a perfect choice for tomorrow's smart clothing, e-textiles, wearables, and transforming or flexible gadgets.



Grip Metal

It is a patented barbed metal sheet that allows virtually any two, or more, sheet materials to stick together without being glued, welded, or bolted. When stuck together, the two pieces can become up to three times as strong as they were individually, making it a perfect material for furniture design, manufacturing, and construction.

Table 3.3: New materials suggested by Material ConneXion (2016)

To catch the visual attraction, designers should conduct research of the material of existing products in the market and avoid using the most frequently used material in the market as far as possible. For instance, if the most frequently used material of laptops' exterior is plastic, which may potentially cause aesthetic fatigue and reduce the user expectation, an attempt to use bead blasted aluminum alloy can make the exterior more attractive. In other words, an atypical material may add cost to some extent, but it can meet the emotional needs according to the studies in Chapter 2. Designers can make the selection based on the actual situation, such as the product orientation and purchasing level of the target user.

In addition, this thesis suggests that designers should try to use some different combinations of materials to bring visual impacts. Figure 3.21 sets some examples of combination of multiple materials. Due to the limit of capacity, this thesis does not include every potential combination.

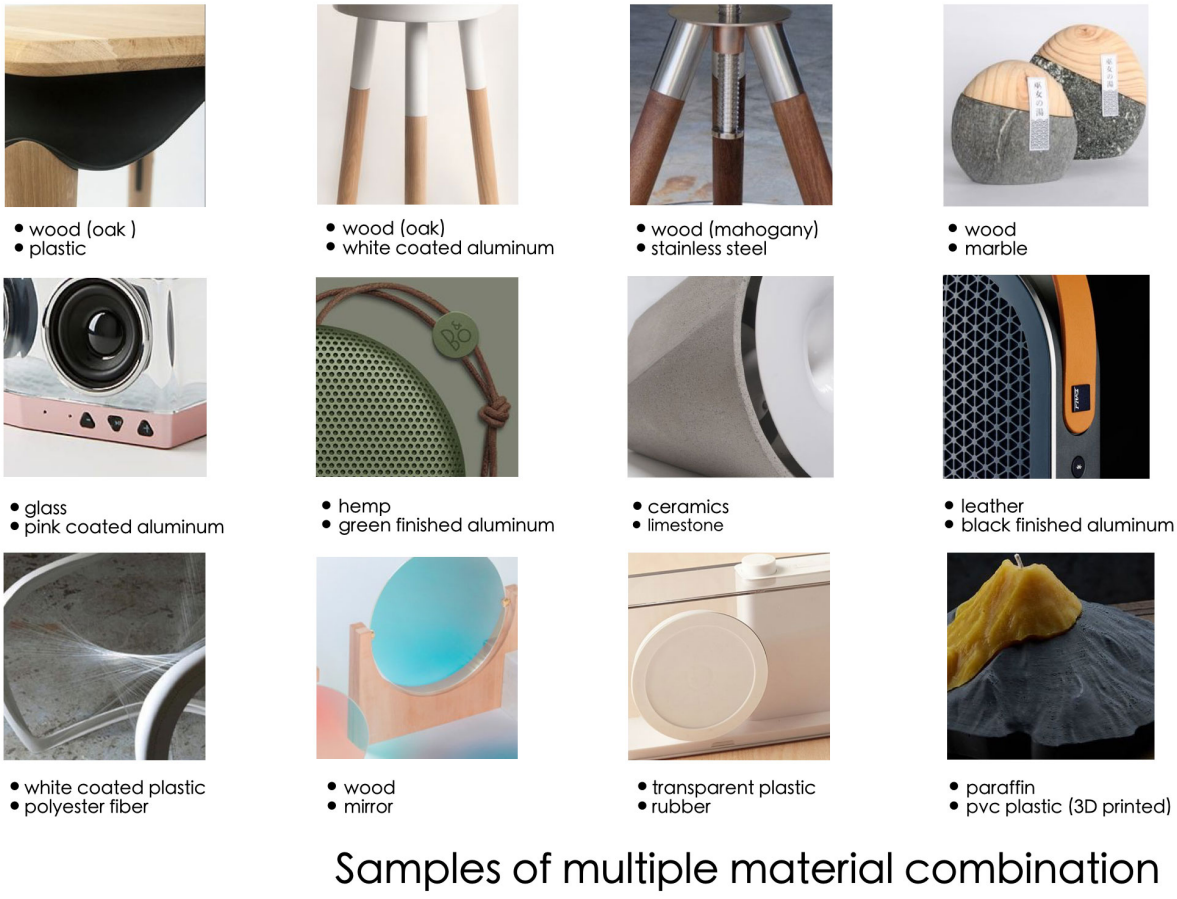


Figure 3.21: Samples of multiple material combination (adapted from Pinterest, n.d.)

3.2.5 Color Theory

Color (American English) or colour (Commonwealth English) is the characteristic of human visual perception described through color categories, with names such as red, orange, yellow, green, blue, or purple ("Color", n.d.). In the visual arts, color theory is a content of practical guidance to color mixing and the visual effects of a specific color combination ("Color theory", n.d.). This section suggests a basic color theory for designing a visually compelling product.

According to Faber Birren (1950), an early American practitioner in the color industry, who left a few general notes on the psychological reactions of colors, in the main, the colors of the spectrum are to be associated with two moods, the warm, active, and exciting qualities of red and its analogous hues, and the cool, passive, and calming qualities of blue, violet, and green. Areas of these hues tend to enliven the mood or to quiet it. Similarly, light colors are active, while deep colors are likely to be passive. Beyond the feeling of warmth or coolness, brightness or dimness, the exact choice of a hue or tone is a fairly optional matter, and its power to arouse pleasure or displeasure may depend on individual predilections. Pure colors, however, are likely to be severe. Too much harping on any one color may prove distressing. A few psychologists have carried out research to determine the moods which people associate with the colors of the spectrum. N. A. Wells found that deep orange has the most exciting influence, then scarlet and yellow-orange. The most tranquilizing color is yellow-green, then green. Violet has the most subduing influence, purple next (Birren, 1950).

However, the fact that a color may have contradictory qualities depending on the particular viewpoint of the observer can not be ignored. Green is an excellent case in point. As seen objectively, it is cool, fresh, clear, and altogether pleasing. But green illumination shining on the human flesh causes a subjective viewpoint that instantly makes the color repulsive. Thus no list of color associations is adequate unless it takes into consideration these subjective as well as objective aspects. For reactions will differ as a person associates color with the outside world or with him or herself (Birren, 1950).

MODERN AMERICAN COLOR ASSOCIATIONS

Color	General appearance	Mental associations	Direct associations	Objective impressions	Subjective impressions
Red	Brilliant, intense, opaque, dry	Hot, fire, heat, blood	Danger, Christmas, Fourth of July, St. Valentine's, Mother's Day, flag	Passionate, exciting, fervid, active	Intensity, rage, rapacity, fierceness
Orange	Bright, luminous, glowing	Warm, metallic, autumnal	Halloween, Thanksgiving	Jovial, lively, energetic, forceful	Hilarity, exuberance, satiety
Yellow	Sunny, incandescent, radiant	Sunlight	Caution	Cheerful, inspiring, vital, celestial	High spirit, health
Green	Clear, moist	Cool, nature, water	Clear, St. Patrick's Day	Quieting, refreshing, peaceful, nascent	Ghastliness, disease, terror, guilt
Blue	Transparent, wet	Cold, sky, water, ice	Service, flag	Subduing, melancholy, contemplative, sober	Gloom, fearfulness, furtiveness
Purple	Deep, soft, atmospheric	Cool, mist, darkness, shadow	Mourning, Easter	Dignified, pompous, mournful, mystic	Loneliness, desperation
White	Spatial—light	Cool, snow	Cleanliness, Mother's Day, flag	Pure, clean, frank, youthful	Brightness of spirit, normality
Black	Spatial—darkness	Neutral, night, emptiness	Mourning	Funereal, ominous, deadly, depressing	Negation of spirit, death

Figure 3.22: Modern American color associations (Birren, 1950)

Figure 3.22 shows the modern American color associations. As can be seen in the Figure, some direct associations such as “Christmas” as to Red, “Halloween” as to Orange is related to Cultural background. Thus, it is hard to define each color’s psychological reaction into a universal guideline.

A color wheel is an abstract illustrative organization of color hues around a circle, which shows the relationships between primary colors, secondary colors, tertiary colors etc (”Basic Color Theory”, n.d.). In color theory, a color scheme is the choice of colors used in design for a range of media (“Color wheel”, n.d.). This thesis suggests that a color scheme for visually compelling products should be more than 120°difference between two colors in the color wheel to create visual contrasts of warm and cold, energetic and peaceful. As Figure 3.23 shows, the complementary colors have 180°gap between each other, which create highly contrasts of visual impacts. On the contrary, analogous colors have narrowed the gap under 90°, which should be avoided in designing visually compelling products.

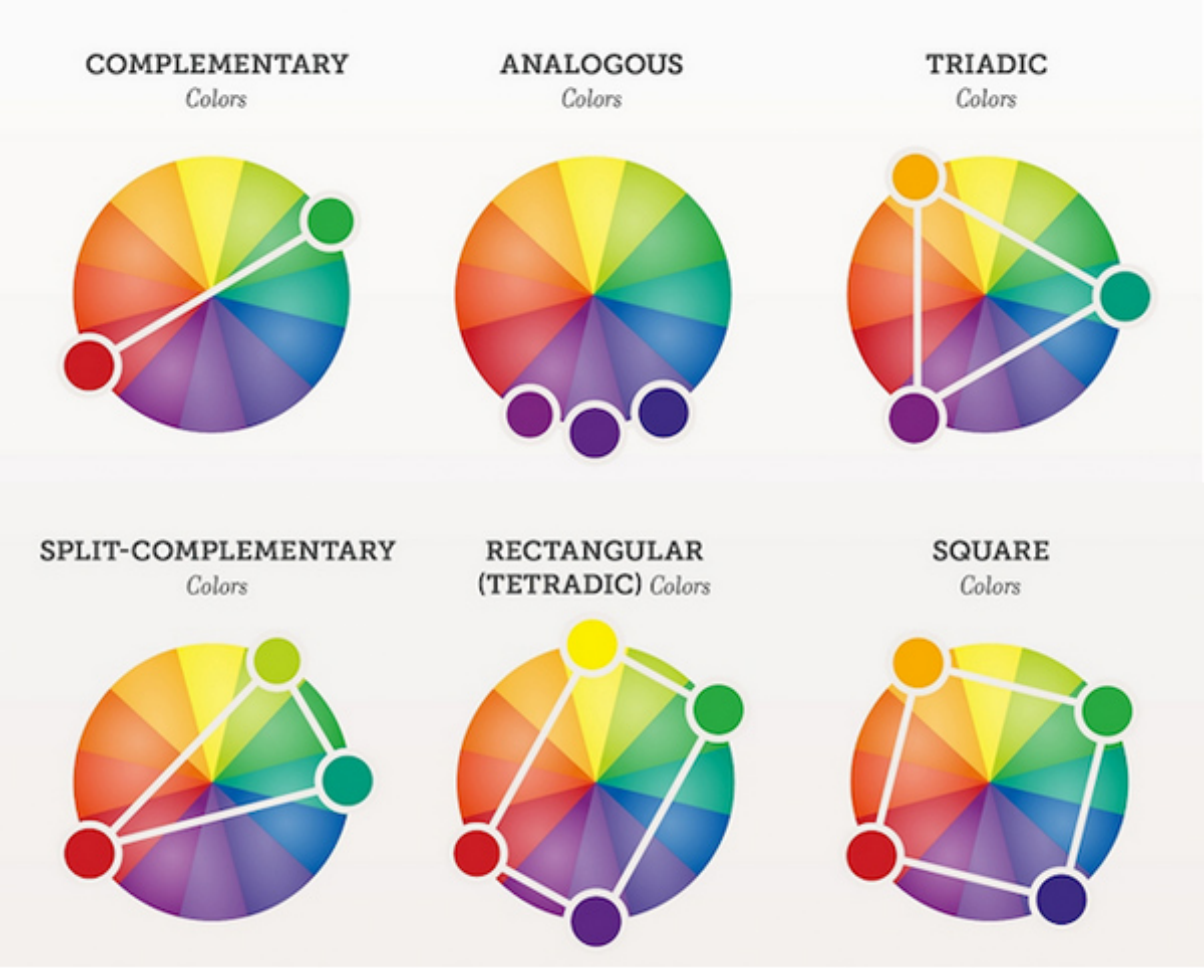
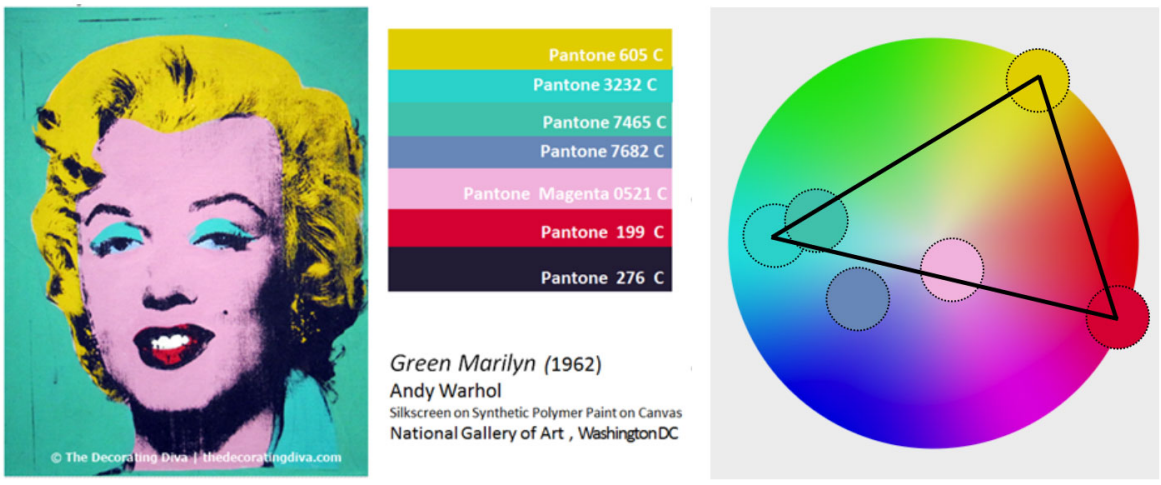


Figure 3.23: Color wheel (adapted from Pinterest, n.d.)



Analyzing the color scheme of Pop Art representative work

Figure 3.24: Pop Art Color scheme analyzation

By analyzing the color scheme of Pop Art representative work (Figure 3.24), this thesis finds out that major colors in Pop Art each have nearly 120°gap between one another, which is closest to the triadic model in the Figure 3.23.

3.2.6 Culture and Philosophy

According to the former studies in Chapter 2, the culture, background and experiences of the consumer are influential in determining their response to products (Bloch, 1995). Due to the wide range of different culture, this thesis is incapable of discussing varieties one by one. Designers may extract the cultural element by conducting research on the target user and local culture. Psychological suggestions along with emotional value are also important to visually com- pelling products. Specific analysis needs to be done for specific issues.

Culture is the customary beliefs, social forms, and material traits of a racial, religious, or social group; is the characteristic features of everyday existence (such as diversions or a way of life) shared by people in a place or time popular culture Southern culture; is the set of shared attitudes, values, goals, and practices that characterizes an institution or organization a corporate culture focused on the bottom line; is the set of values, conventions, or social practices associated with a particular field, activity, or societal characteristic studying the effect of computers on print culture (?, ?).

Eastern culture is different than western. The principle of Yin and Yang is that all things exist as inseparable and contradictory opposites, for example, female-male, dark-light and old-young. Dating from the 3rd century BCE or even earlier, the principle is a fundamental concept in Chinese culture and philosophy in general. The two opposites of Yin and Yang attract and complement of each other and, as their symbol illustrates, each side has an element of the other (represented by the small dots). Neither pole is superior to the other and, as an increase in one brings a corresponding decrease in the other, a correct balance between the two poles must be reached in order to achieve harmony (Cartwright, 2018).

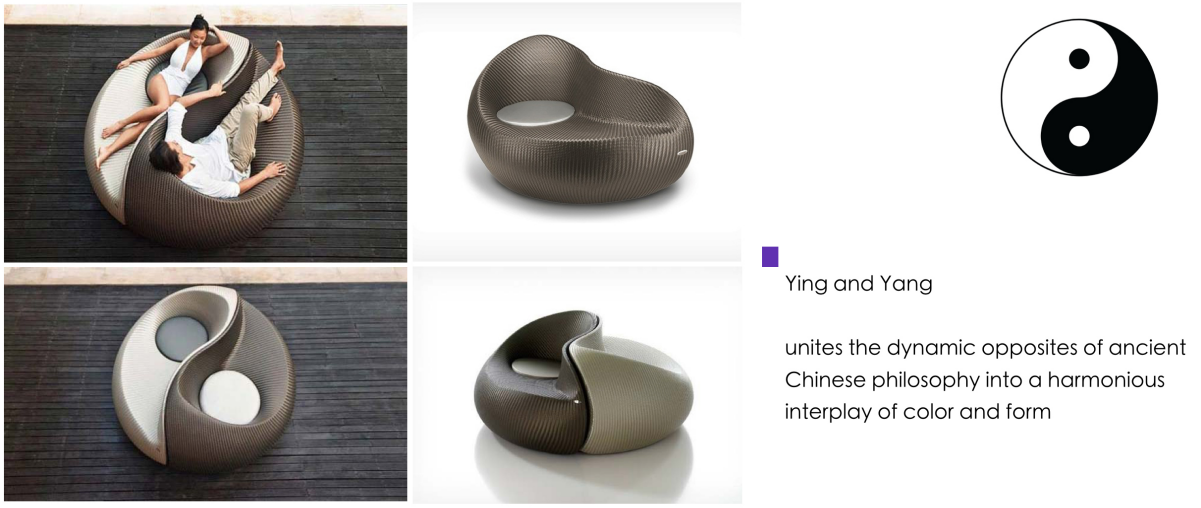


Figure 3.25: Culture inspired design - YING YANG

As Figure 3.25 shows, YING YANG designed by Nicolas Thomkins in 2008 has its origins in the harmony of forms. It unites the dynamic opposites of Chinese philosophy into a harmonious interplay of form and color; bronze and platinum colored fibres relflect this harmony in alternating covenx and concav surfaces (Tuturas, 2008).

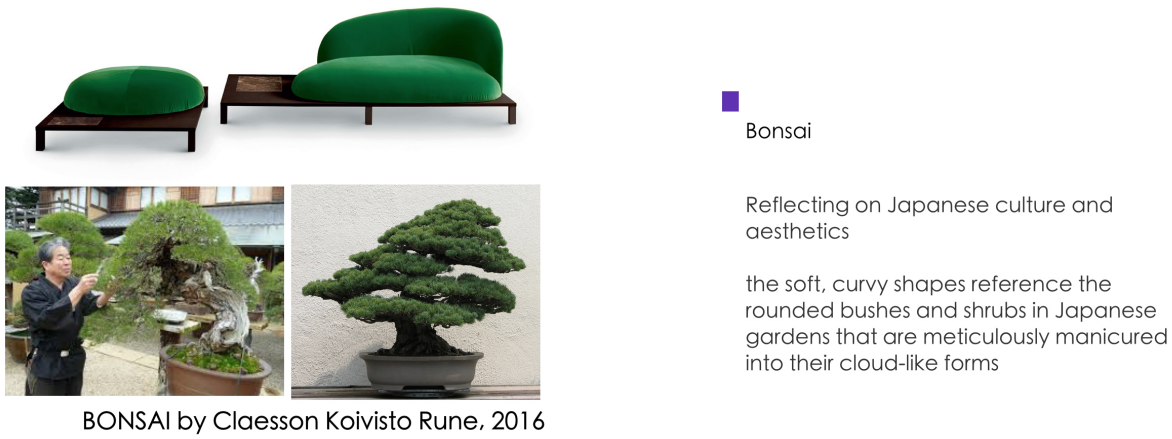


Figure 3.26: Chinese Culture inspired design - BONSAI

Bonsai ('tray planting' in Japanese) is a Japanese art form using cultivation techniques to produce small trees in containers that mimic the shape and scale of full size trees (Wikipedia, n.d.-a).

Figure 3.27: German designer Dieter Rams’s design philosophy

Braun is a well-known German brand in design history. Dieter Rams’ work for Braun and neither does the man himself has become an icon to a growing set that identifies with design, whether for reasons of style, commerce, or a notion of ”design thinking.” His design shows how newly affluent post-World War II Germany set the stage for thoughtful and experimental, yet approachable and useful, product design, and gave rise to a singularly inspiring body of work, that Jonathan Ives at Apple adapted as a starting point, and used to fuel the rise of the computer and electronics maker to its position as technological, and cultural, powerhouse. It is a convincing story, especially as Rams himself lauds the work of Apple, a company that has risen to one of the world’s most valued and respected (Alderman, 2011).

Rams’s design philosophy suggests that good design is aesthetic. The design technics such as “repeat and symmetry”, “combination of round arc and straight” is often applied to his design. Overall, the form styling of Braun is neat and smart, while it become visually compelling with the specific cultural background and Rams’s design thinking.

Figure 3.28: Scandinavian design

Today, most define Scandinavia and the Nordic region to include the following countries: Denmark, Norway, Sweden, Finland, and Iceland ("Scandinavia", n.d.). Scandinavian design has been perhaps most widely recognized in furniture, which spread the principles of its creators. The principles of Scandinavian designŁ is prioritizing functionality without eliminating grace and beauty.

In the mid twentieth century, surviving became easier, and functionalism evolved into meeting the emotional needs of people. This gave Nordic functionalism a more natural and humanistic side.

The long winters and shortage of sunlight inspired Scandinavian designers to create bright, light, practical environments. They tried to make the domestic environment as comfortable as possible with the materials at hand. These trends were adapted by neighboring countries and eventually spread all over the world. The high-quality designs live on today and are recreated continually in various fields, confirming their timelessness.

As Figure 3.28 shows, Poul Henningsens distinctive lamp designs were a good example of Scandinavian design: the beauty of the elegant smooth lines does not prevent the lamp from performing its function exactly as it was designed to do. Henningsen looked for solutions to spread the light of a bulb as widely as possible without the glare being visible.

Today, the Scandinavian aesthetic, of mass-produced design that is accessible and available to all, with a touch of grace, reminds the user that the products creator is human (Eybors-dottir, 2011).

3.3 Verification of the VFP checkpoints

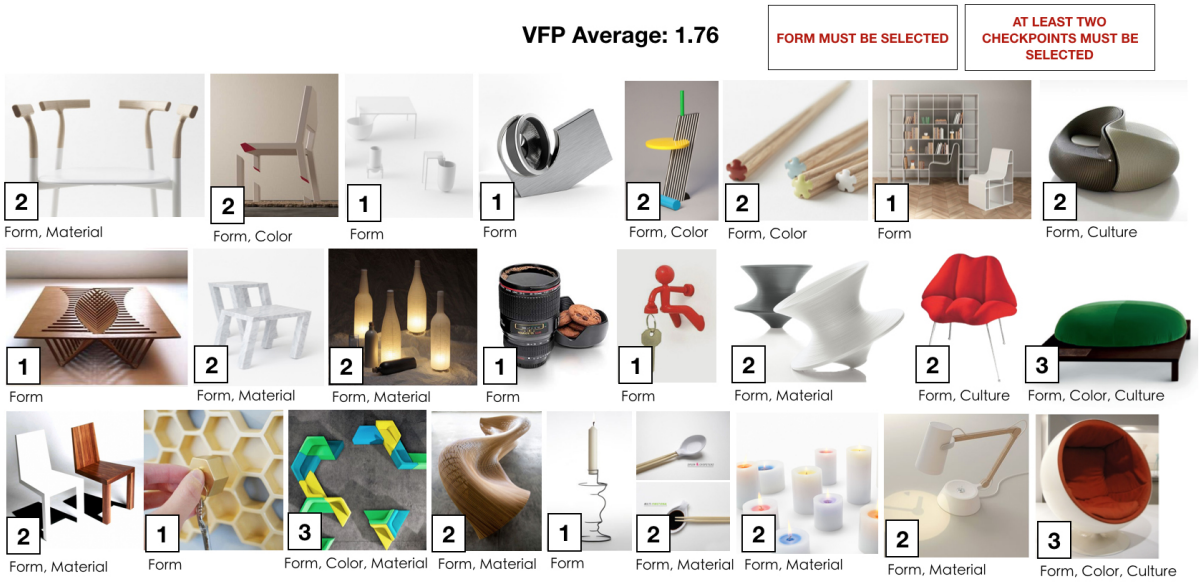


Figure 3.29: Verification of the VFP checkpoints in selected designs

It is suggested in the design procedure that at least two checkpoints must be selected to design a visually compelling product. Figure 3.29 shows a summary of VFPs applied in 25 designs, and the average VFP checkpoints is 1.76. Thus, it is proved that the following rules can be applied to the design procedure: firstly, form must be selected; secondly, at least two checkpoints must be selected to ensure the visual compact.

Chapter 4

APPLICATION OF DESIGN GUIDELINES

4.1 Introduction

In today's urban life, people pay more attention to their living environment. Furniture of good quality and visual pleasure is essential to everyday life and plays an important role in people's living quality. Thus, this thesis will take furniture as an example to apply the design guidelines. The guidelines and design checklist, developed in previous chapters, will be demonstrated in this chapter. This chapter will focus on following the design guideline and applying at least two VFPs in order to achieve a design result that satisfies the product function and contains VFP features.

4.2 Clothes Hanging Rack and Floor Lamp Redesign

In today's market, furniture is commonly divided into many basic categories. Apart from the basic furniture such as a table, chair or bed, a clothes hanging rack and floor lamp can be secondary, which also means there are more potential design opportunities for designers to explore. In this thesis, a set of clothes hanging rack and floor lamp are chosen to demonstrate the guidelines; other categories may be included in future studies.

4.2.1 Design Opportunities of Clothes Hanging Rack

In the current market, clothes hanging racks are mostly made from metal or wood, due to the features of hardness and durability. Metal finish such as chrome is easy for cleaning. Wood can adapt to most interior living environments. As the Figure 4.12 shows, the majority of clothes

hanging racks in the market are two or four straight legs standing on the ground. Conveniently adjustable racks are designed for easy flat packaging. Clothes hanging racks applied with caster wheels are easy to move, which is very popular among customers. Some hanging racks are designed with a place for putting shoes.

Figure 4.1: Research of existing clothing hanging racks in the market (from left to right, top to bottom: Samkelham, n.d.; Orlan- press, n.d.; Allovertop, n.d.; Revista Sede Design, n.d.;)

Here are some design features of the existing clothes hanging rack:

- Hat hanger
- Shoe rack
- Wood Construction
- Adjustable
- Caster Wheels

4.2.2 Design Opportunities of Floor Lamp

Figure 4.2: Research of existing floor lamps in the market (from left to right, top to bottom: World Market, n.d.; Schoolhouse, n.d.; Target, n.d.; The Home Depot, n.d.; Target, n.d.; Blu Dot, n.d.)

There are mainly six types of floor lamps in the market: arc floor lamps, shelf floor lamps, torchiere floor lamps, tripod floor lamps, task floor lamps, multi-head floor lamps. The majority of floor lamps have one leg, standing with a heavy base. The rest are tripod floor lamps. The most common floor lamps' legs are metal finished. Lighting shade materials vary from metal, glass cotton and other fabrics.

Here are some design features of the floor lamp:

- Lighting shade
- Light Bulb Sockets
- Adjustable Stand

- Electric Cord/Cable

4.3 Apply Guidelines to the Design Process

4.3.1 VFPs of the Clothes Hanging Rack

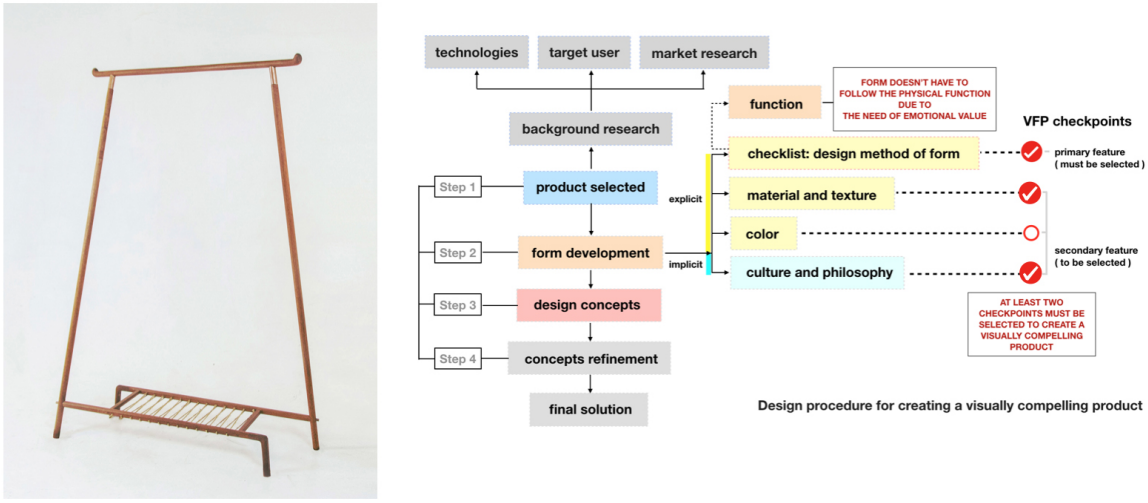


Figure 4.3: Design process flow chart - Clothes Hanging Rack

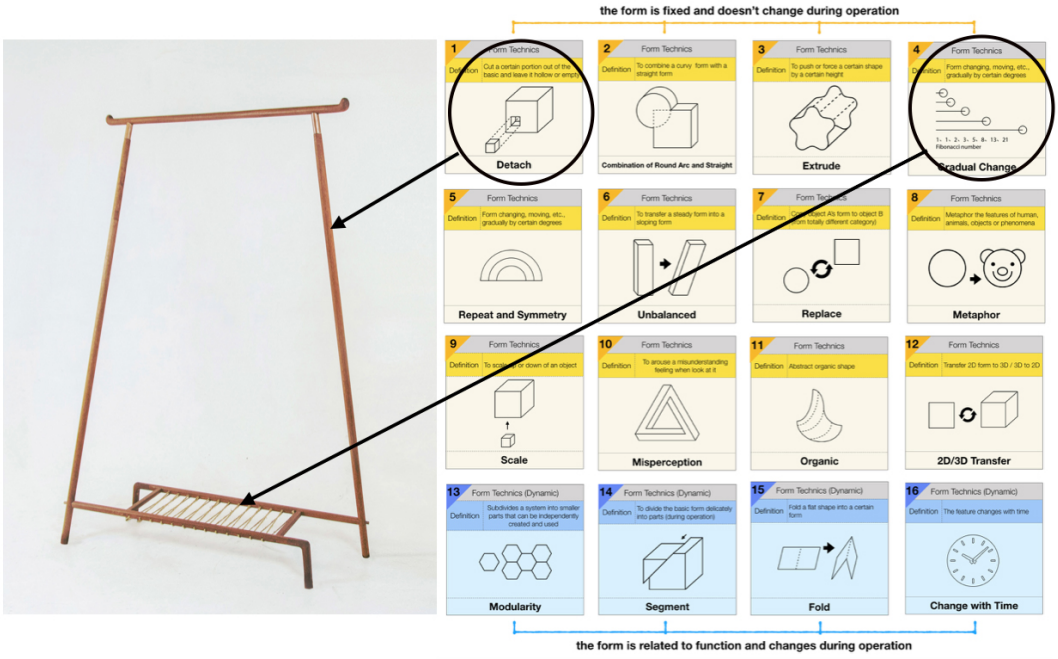


Figure 4.4: VFP checkpoints of the Clothes Hanging Rack

- Form

  At the first glance, the style of this clothes hanging rack is simple and clean. When looking into details, it removes two legs to create a visual imbalance. The form method "detach" is being applied at this point. What is more, the surface of shoe rack is designed with z-shape strings instead of regular straight lines. The form method "gradual change" is applied at this point.

- Culture

  The curvy perks as the hat hangers at two ends of the horizontal rack is a reflection of Chinese culture. Everted Flanges are a form of decoration in Chinese furniture(Figure 4.5). Also, it is a reflection of Huizhou-style architecture, a remarkable branch of traditional Chinese architecture (Figure 4.6). Huizhou-style architecture takes advantage of the local landscape, takes fengshui into account and has a unique aesthetic. It features black tiles, white walls, horse heads and archways made of stone to form landmarks (China Daily, 2015). From the external form of the residential buildings, the "horse head-shaped walls" are higher than the roof of houses which can slightly be seen, with some "horse head-shaped walls" being tall in the middle and low at both ends and some slanted on the top as a herringbone-shaped and downwards at both ends. The grey tile eaves are warping to the blue sky, drawing an outline of the top of walls and the sky, which adds a beauty of structure and rhythm and reflect the harmony between heaven and man (Taoyang, 2010).

Figure 4.5: A long table with everted flanges and decorated with Guaizi Pattern, Huanghuali Wood (China-Redsandal-Wood-Museum, n.d.)

Figure 4.6: The ”horse head-shaped walls” are the typical characteristics of the Huizhou-style architecture (Huang, n.d.)

- Material

  The clothes hanging rack is mainly built from Mahogany wood, with aluminum joints and hemp ropes bound as the shoe rack.

Figure 4.7: The combination of wood and metal

In traditional Chinese furniture, wood pieces are connected with wood joints. While in this design, a round and tilted wood joint cannot be made by traditional lathes. The metal joints can simplify the wood craft process and bring visual contrast. Figure 4.7 shows

the connection of the metal joint and wood rack. The joints are made by aluminum and painted in copper finish.

Figure 4.8: The combination of wood and hemp

What is more, hemp ropes are applied to the surface as the shoe rack. Compared with the common materials such as plastic or metal, the combination of wood and hemp brings a feeling of nature and tranquility.

4.3.2 VFPs of the Floor Lamp

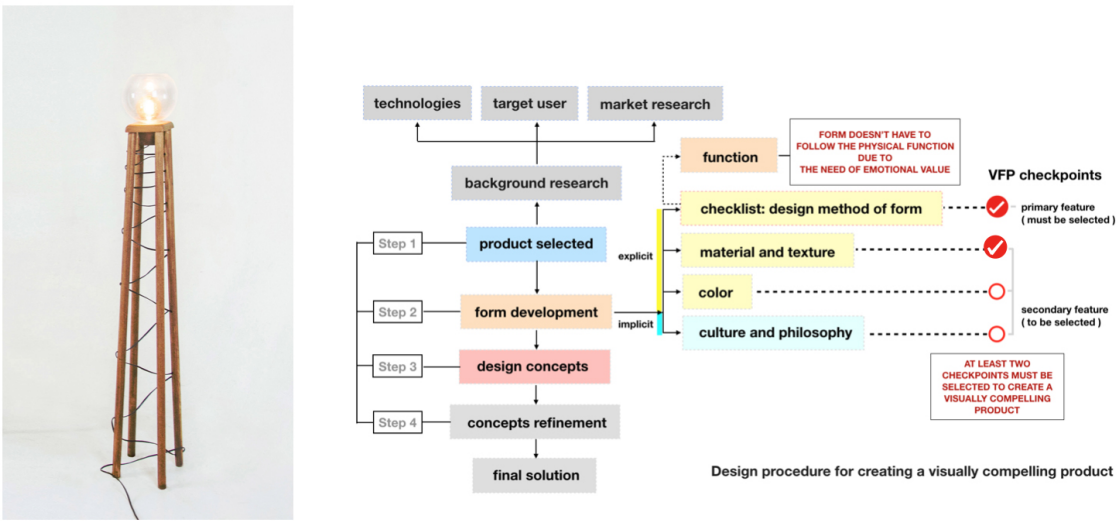


Figure 4.9: Design process flow chart - Floor Lamp

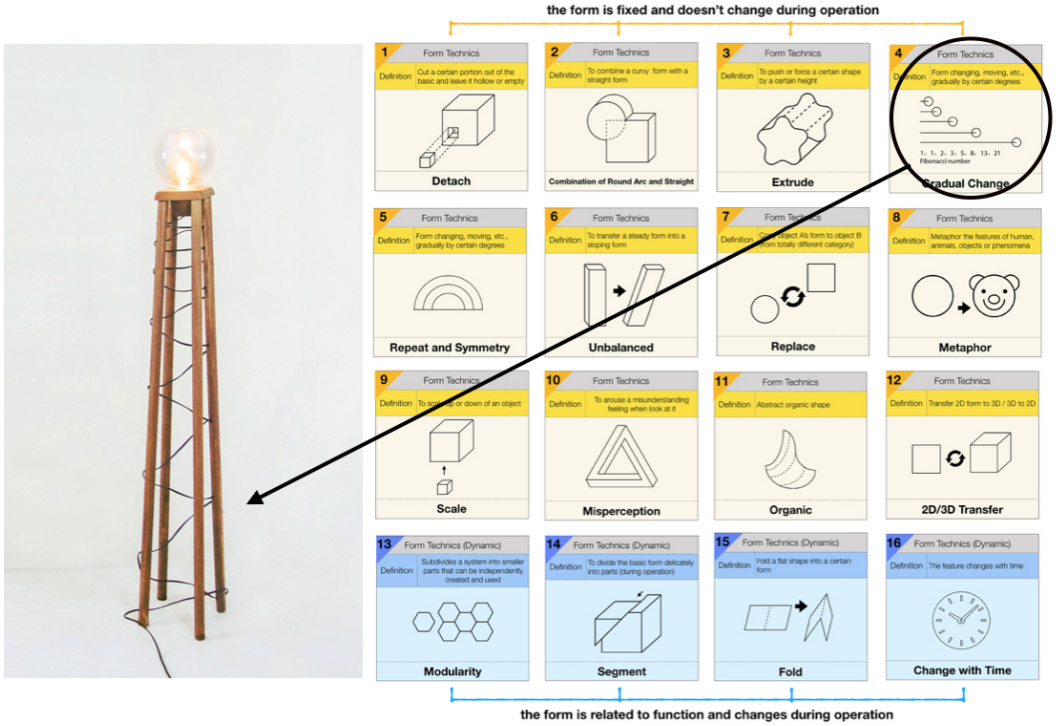


Figure 4.10: VFP checkpoints of the Floor Lamp

- Form

The lighting cable is designed as the decoration entwined with the standing legs. The form method “gradual change” is applied at this point. It is a perfect combination of form and function. The basic feature of a light is transformed into a decoration, which makes the legs more interesting to look at.

- Material

The lighting shade is designed to be a glass globe to bring a visual contract of wood and glass.

4.3.3 Color Variation

To add more VFPs toward the design, there are two variation of color according to the color scheme developed in Chapter 3.

Figure 4.11: Color variation - Chinese culture related color

Figure 4.11 above shows an application of Chinese culture related color. Black and red are the major color of Chinese spring festival scrolls. Red reflects happiness and good luck in traditional Chinese culture, and the combination of black and red also brings a high visual contract.

Figure 4.12 below shows an application of Pop Art color scheme. Green and purple has a more than 120°gap in the color wheel, which can make the design visually compelling.

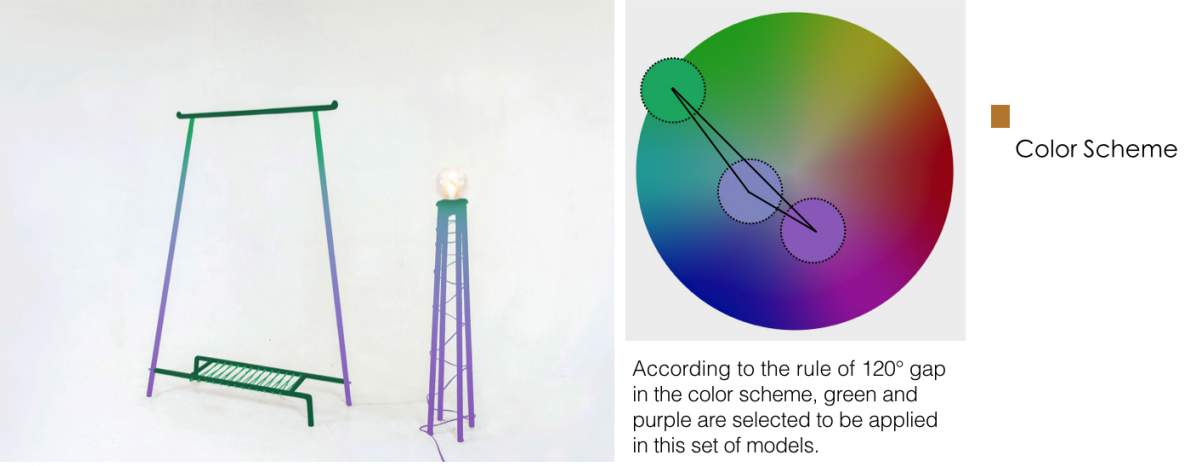


Figure 4.12: Color variation - Pop Art color scheme

4.3.4 Photo Gallery of the Physical Models

Figure 4.13: Physical models - view 1

Figure 4.14: Physical models - view 2

Figure 4.15: Physical models - color variation

Figure 4.16: Physical model - floor lamp lights on

Figure 4.17: Physical model - floor lamp lights off

Figure 4.18: Clothes hanging rack detail 1

Figure 4.19: Clothes hanging rack detail 2

Figure 4.20: Clothes hanging rack detail 3

Figure 4.21: Physical models - view 3

Figure 4.22: Physical models with plants

4.4 Summary

This set of furniture successfully followed the design guidelines in this thesis. The clothes hanging rack and floor lamp bring a strong visual impact by applying the visual focusing points in Chapter 3. The designed furniture successfully shows exploration of the design guideline.

Chapter 5

CONCLUSIONS AND FURTHER DEVELOPMENT

5.1 Conclusion

This thesis aims to develop guidelines that contribute to designing a product which is visually compelling. Visually compelling products has unique appearance that can stand out from other products on the existing market and can arouse users positive feeling, curiosity and stimulate creative thinking. The user expectation of the function might be different from the actual operation due to the combination of unique form and physical function. This thesis assumes that a visually compelling product at least have a visual focusing point (VFP), which can help designers and companies to evaluate the product: the more VFPs it has, the more visually compelling the product is. The results of the literature review study show that the visual domain in product design is important to customers, and emotional design is essential to our daily life. The historical art and design genre is still inspiring contemporary design. Then, the results of case studies show that designing a visually product must mainly focus on form design, materials, colors, culture and psychology. Later, this thesis suggests a general design procedure for designing visually compelling products. First, a checklist of form method is developed: there are 16 methods of form for designers to choose; Secondly, tables of new materials and multiple material combination for designers as reference are provided; thirdly, a color scheme is given as a reference. Thus, based on these studies, the design guideline has been created. Lastly, a set of clothes hanging rack and floor lamp is designed to demonstrate the application of the guideline.

5.2 Further Developments

There are more aspects that can be further investigated in the next phase. Suggestions for further research are as follows:

1. This thesis mainly focuses on studying form elements of product but considers less the function domain of visually compelling product. Designers could further develop the approach for combining form and function in an appropriate way.

2. These checklists provide designers with a new choice beyond existing design guidelines. As time progresses, some checklists such as materials could be improved by new technologies.

3. The sufficiency and effectiveness of the guidelines need to be verified by the feedback from other designers and consumers, or studies from other researchers.

4. Due to the limitation of time and energy, the guidelines of culture and psychology in the design procedure are not fully developed. The details need to be discussed in the future.

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