The Role of Sketches in Fashion Design
-Focus on a Case Study of a Professional Designer’s Process-

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Abstract
This study investigated the key role of sketches in creative fashion design by observing the cognitive process of idea development through a professional’s design problem solving using the medium of hand sketching. The three-part semi-constrained design experiment with a professional designer, in which the participant designer was provided a source of inspiration image and asked to design a small collection of outfits, identified a fashion designer’s idea development process as involving two phases of sketch processes: lateral and vertical transformation. Analysis of the video/audio recording and corresponding interviews validated lateral transformation in the designer’s use of sketches to represent interpretation of the provided inspiration source. Through sketching, the designer transferred fuzzy ideas onto paper. Vertical transformation was observed through the designer’s modification of previous ideas after reflecting on earlier sketches, with various ideas divided, manipulated, discarded, regrouped, and combined through sketching activities. The designer’s sketching process is valuable design knowledge that facilitates the idea development process and ultimately triggers generation of creative ideas. Understanding it may benefit practitioners and educators.

I. Introduction

Sketches are the language of a designer. Designers not only draw to provide a model of the final outcome—the product or the garment—but also use sketches to develop their design ideas. A draft sketch is used by the designer to communicate with himself or herself rather than others, and therefore, it is often rough. A designer may quickly move on to the next draft sketch without finishing the entire figure or image. As such, a draft sketch is at times too hard to recognize without the designer’s explanation. In contrast, final sketches are drawn as accurately as possible to deliver ideas to a designer who works in a company. Final sketches are intended to
communicate with others, and often include detailed verbal notes. Sketches are among the methods most widely used by designers, although a number of designers may initiate design ideas directly from materials (e.g., draping).

Designers make sketches to generate ideas during the design process. These sketch activities help designers immediately capture ideas for examination, as well as allow later review for further idea expansion. Ultimately, a designer develops ideas through the sketching process. Therefore, capturing every step of the sketching activity reveals what a designer thinks.

Previous studies in fields such as cognitive science, architectural design, and fine arts have discussed the important role of sketches in visual representation (Goel, 1995; Goldschmidt, 2002; Suwa, Gero, & Purcell, 2000). Many researchers in other design fields have looked into the details of sketch process to reveal the cognitive process of designer’s ideation (Gero & Tang, 2001; Kavakli & Gero, 2002; K. Kim, 2016; Y. Kim, & K. Kim, 2014; B. Kim, 2015; Schön & Wiggins, 1992). While some explored the concept of creative process in the field of fashion design (Oh & Lee, 2007; Shin & Shin, 2011), few studies have examined how a fashion designer utilizes sketches during the idea development process (Lee & Jirousek, 2015). This study therefore aims to investigate the roles of sketches in the creative fashion design process. This research attempts to examine empirically the cognitive process of idea development through a professional’s design problem-solving skill expressed through the medium of hand sketching.

II. Background

1. Design as an Ill-defined Problem

Design researchers consider the design process as a special type of problem-solving activity that consists of small steps through which a designer explores a problem. For the designer, a design problem is identified as an “ill-defined” or “ill-structured” problem (Schön, 1983: Simon, 1969). That is, the problem does not clearly show start states (where to start), goal states (when to end), and intermediate states (what type of steps to proceed through). All stages are vague to designers at the beginning of the design task. In contrast, well-defined problems present clearly defined start, goal, and intermediate states. Typical examples are algebra, linear equations, the Tower of Hanoi, and chess. These problems have specified first steps (although some may have several possibilities), known final goals, and a process through which they may be met.

The design problem may seem ill-defined at the outset, but upon re-framing, it will become a well-defined problem. Without foreseeing the final outcome, the designer can proceed through the process to reach the end goal (or a final design product) by responding to each moment. This practice is referred to as “reflection-in-action” (Schön, 1983). During this process, the designer applies a constant reflective dialogue of “seeing-moving-seeing,” that is, the interaction of designing and discovery (Schön & Wiggins, 1992: Schön, 1983). During each step, a designer sets a hypothesis, explores an experiment, and applies his or her judgment to achieve a “satisfying” solution. This means that the designer finds the solutions not by searching for every possibility but rather by choosing the most suitable solution in each moment (Schön, 1983: Simon, 1969).

The series of design process is vague and labyrinthine. Hand sketches are the most suitable and effective method to proceed in solving this ill-defined problem.

2. Characteristics of Sketches

A number of features of the sketch method make it suitable for solving design problems. Sketches do not require drawing concrete or finished objects. A designer may scribble without any direction and can always stop without finishing the drawing. This type of sketch works well, especially for exploring early design ideas, owing to its ambiguity that corresponds with the vagueness of design problems at the initial state (Goel, 1995), or when designers feel stuck (Cross, 1999). Further, this feature allows a designer to handle different levels of the
hierarchical structure in a design problem. With the sketch method, a designer can simultaneously travel from the detailed aspects of design ideas to the overall concept (Cross, 1999). Sketches, with pencil, a pen, and eraser, are easy and fast to do and redo (Goldschmidt, 2002). The ease offered by this method helps designers create as many alternative ideas as possible. As cited in Cross (1999), Marples (1960) claimed that "the nature of design problem can only be found by exploring it through some alternative solution proposal."

In addition, sketching activities help foster creative design thinking. First, a designer uses sketches as a "design thinking tool" (Goldschmidt, 2002). A designer puts ideas down on paper, and in observing them, may discover satisfying new features of the design ideas (Schön & Wiggins, 1992). Thus, the process is iterative. Through the sequence of this process, a designer crystallizes ideas through sketches, or has a conversation between sketches and self (in what is referred to as "dialectics of sketching" by Goldschmidt, 1991). Therefore, sketches are also known as a window into a designer’s mental process (Kavakli & Gero, 2002). Second, a designer may observe non-pictorial meanings when reviewing the shapes he/she sees in sketches. Goldschmidt (1991) coined the terms "seeing as" and "seeing that," and identified these two types of activities of the design process from the protocol. "Seeing as" is linked to the sketching in which a designer interprets and redesigns pictorial images (e.g., the color, size, or silhouette of clothing), whereas "seeing that" is the thinking process in which a designer examines the non-pictorial meaning of the sketch (e.g., functionality, practicality, or marketability). Third, a designer observes clues on a design idea from previously drawn sketches (Gero & Tang, 2001). A designer may come upon a new idea from previously drawn sketches. From the empirical sketch activities of a 9-year-old girl, Goldschmidt (2003) discovered that sketches act as a modulator of the problem space. Sketch lines drawn accidently can be interpreted as unplanned ideas. In other words, sketches can lead the direction of the concept. Similarly, Suwa et al. (2000) reported that designers unexpectedly discover new ideas from unintended drawings termed as situated-invention (S-invention). In a later study, they found that a designer groups and regroups parts of sketches to create new ideas with different meanings (Suwa, Tversky, Gero, & Purcell, 2001).

3. Goel’s Transformations in Design

According to Goel’s (1995) theory of sketch types, there are two types of transformations in the design process: lateral and vertical transformations. Lateral transformation is “[the] movement from one idea to a slightly different idea,” whereas vertical transformation is “[the] movement from one idea to a more detailed version of the same idea” (p.119). In other words, a designer creates a modified drawing of related but distinctly different sketches in a lateral transformation and embellishes an existing sketch with more explicit, detailed drawings in a vertical transformation. Goel (1995) explained that “lateral transformations are generally confined to preliminary design phases whereas vertical transformations generally occur in the refinement and detailing phase” (p.119).

The present study investigates the scope of the phrase in explaining the design sketch process, and then provides a detailed breakdown of design components to describe and observe the two types of transformations.

III. Research Method

1. Participant

Semi-constrained design experiment with a professional designer was conducted. The participating professional designer is an actively working fashion designer, with four years of formal fashion design education and seven years of fashion industry experience in New York City. He runs his own brand as a creative director and has presented collections in runway shows in New York. The
study participant provided informed consent, and the study design was approved by the appropriate ethics review board.

2. Experiment

The experiment consisted of three parts: pre-design interview, design session, and post-design interview. The participant designer was given a source of inspiration image (Figure 1) and then asked to design a small collection of five contemporary women’s wear outfits with front and back views in color, using hand sketching. The designer was asked to design according to his normal practice for his own work.

Before starting the design session, the participant designer responded to an open-ended questionnaire on his background, such as number of years of formal design education, design classes taken, industry experience, and current target customers. During the design session, the designer used the various drawing materials provided. The designer was asked to focus as much as possible on the given image and not recall or apply anything he had seen in other fashion designers’ collections. The researcher closely observed the designer’s entire design session via a recording camera connected to a computer screen in an adjacent observation room (Figure 2). While the designer was working on the design task, the researcher developed open-ended questions based on his sketch activities for the post-design interview. This part was conducted immediately after the design session to clarify the design sketches and ideas that had emerged during the process while the experience was still fresh in the designer’s mind. The entire experiment was video/audio recorded with a progressive scan camera, and the draft and final sketches were collected for analysis. The brief of procedure is shown in Table 1.

3. Analysis Procedure

The entire design process was observed and then broken down into the flow of the designer’s sketch strokes. The interview was reviewed with each design movement. The video data were matched with the corresponding interview

Figure 1. Selected Source of Inspiration: Images of the Notre Dame Cathedral -Photographed by author
data. The following research questions were identified while reviewing the design experiment: (a) How and when do the source of inspiration images transform into sketches? (b) How do the following draft sketches unfold? (c) How are the final sketches related to the draft sketches? (d) How do the sketches show lateral and vertical transformation? (e) Which concepts are developed through the series of sketches?

IV. Results

1. Design Process

Based on the source of inspiration image, the participant designer created 17 draft sketches and 6 final sketches (Figure 3), front and back, using color markers, within approximately 3 hours of the allotted 4 hours. The sequences of draft and final sketches are shown in
chronological order in Figure 3. The designer quickly moved and smoothly drew draft sketches, as if he knew fully well the direction he should pursue. However, in draft #15, he trashed his sketches, and said he “was not satisfied with it.” He stopped generating ideas in draft #17 although there was plenty of time left. He seemed
confident with his draft ideas and then moved on to draw the final sketches in color.

2. Two Phases of Sketch Processes

The analysis of this design process shows that there are two phases of the sketching design process (Table 2 for the examples). First, the designer transfers the imagery in his mind to paper. In this process, both conceptual and superficial interpretations from the source of inspiration unfold on paper without any judgment on the ideas. Second, the sketches from the first phase are further developed for design concepts and details. During this phase, the designer interprets and re-interprets the sketches through self-reflection and eventually arrives at the final concepts and outcomes.

Table 2. Two Phases of Sketch Process

<table>
<thead>
<tr>
<th>Sketch Processes</th>
<th>Designer’s Activity</th>
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<tbody>
<tr>
<td><strong>Phase 1</strong></td>
<td>&gt;Unfold superficial interpretations from the source of inspiration on paper without any judgment about the ideas.</td>
</tr>
<tr>
<td>Lateral Transformation</td>
<td>&gt;Suggest new draft concepts on paper.</td>
</tr>
<tr>
<td><strong>Examples From the Experiment</strong></td>
<td></td>
</tr>
<tr>
<td>Draft 1</td>
<td>Suggested voluminous fabric idea (the designer mentioned “volvers”).</td>
</tr>
<tr>
<td>Draft 2</td>
<td>Suggested the layers of the drapery details.</td>
</tr>
<tr>
<td>Final 6</td>
<td>Suggested the layers of the drapery details.</td>
</tr>
<tr>
<td>Draft 7</td>
<td>Decided to use textured and fitted fabric under the drapery layer.</td>
</tr>
<tr>
<td>Draft 8</td>
<td>Adopted the circular window of the Cathedral as a bolero.</td>
</tr>
<tr>
<td>Draft 4</td>
<td>Observed the drapery details from the sculptures (mausolea) in the source of inspiration.</td>
</tr>
<tr>
<td>Draft 2</td>
<td>Observed the drapery details from the sculptures (mausolea) in the source of inspiration.</td>
</tr>
<tr>
<td>Draft 3</td>
<td>Adopted the circular shape of the rose window at the center of the façade of Notre Dame Cathedral.</td>
</tr>
<tr>
<td>Draft 4</td>
<td>Suggested the layers of the drapery details.</td>
</tr>
<tr>
<td>Draft 1</td>
<td>Decided to use the fur to create the volume throughout the collection.</td>
</tr>
<tr>
<td>Draft 5</td>
<td>Decided to use the fur to create the volume throughout the collection.</td>
</tr>
<tr>
<td>Draft 6</td>
<td>Suggested the layers of the drapery details.</td>
</tr>
<tr>
<td>Draft 7</td>
<td>Decided to use textured and fitted fabric under the drapery layer.</td>
</tr>
<tr>
<td>Draft 8</td>
<td>Decided to use textured and fitted fabric under the drapery layer.</td>
</tr>
<tr>
<td>Draft 9</td>
<td>Decided to use textured and fitted fabric under the drapery layer.</td>
</tr>
<tr>
<td>Draft 10</td>
<td>Decided to use textured and fitted fabric under the drapery layer.</td>
</tr>
</tbody>
</table>

The designer developed the first four draft sketches and said in the interview that he gazed and thought what kinds of elements from the inspiration image can be used for his design during this stage. From drafts 1 to 4, he put down his new ideas on paper in the order that he conceived them. In draft 1, he reported that he generated the idea of using lace-like strips with puffy bottom, and then he put own another idea from the inspiration of monk drapery garment in draft 2. In draft 3, he applied a new idea of using a circular window of the Cathedral as a bolero. In draft 4, he mentioned that he imagined a type of girl he was looking for (a target customer), with characteristic hair style, by creating a classic jacket style. During the later process, he came up with new ideas in
draft 6 (fur strips) and draft 12 (manipulated fabric). Overall, the designer utilized the sketches as the representation of his mental image, with sketches being an effective way to transfer fuzzy ideas to a series of new concepts without fixating on any certain idea.

2) vertical transformation

In the refined design phase, the designer developed the first alternative of puffy bottom idea in draft 1. He suggested the voluminous materials, and then decided to use fur for this voluminous area in draft 2. This idea was deepened to another level in draft 3, in which the fur material was mixed with lace strips. In draft 6, the idea of using lace strips was developed into using square fur stripes. The designer gradually expended the concept as he saw the idea from his own sketches. Drafts 2, 7, 12, and 13 show how the drapery concept was changed and modified as he judged the sketches. When he first drew the drapery concept in draft 2, it was similar in shape with the source of inspiration image. However, he asked himself if the design was too dressy. He decided to do create a more modest design with a side drape covering in drafts 7 and 12.

The vertical transformation was observed through his draft sketches: he modified his previous ideas after reflecting on his own sketches, and the various ideas were divided, manipulated, regrouped, and combined through his sketching activities. Both figural properties and non-figural ideas in the sketches were modified through the process.

V. Conclusion and Implication

This study identifies a fashion designer’s idea development process as involving two phases of sketch processes: lateral and vertical transformation. The experiment was conducted with a professional fashion designer, who generated original and creative ideas through hand sketching activities. The analysis of the video/audio recording of the sketching process and interviews revealed both lateral and vertical transformation in the draft and final sketches. These phases correlate with the theory of sketch types proposed by Goel (1995): a designer creates a modified drawing of related but distinctly different sketches (lateral) and embellishes an existing sketch with more explicit, detailed drawing (vertical). The findings of this study is partially aligned with Tovey, Porter, and Newman (2003)’s work which identified sketching and its key roles in automotive’s design. They experimented with the students and the professional designers to trace the different behavior on the use of sketches between conceptualization and visualization of the sketches. They observed that designers tend to explore the lateral transformation for searching concept and the vertical transformation for envision the detailed sketches.

The limitation of this study is the analysis of design activities from only one designer. Similar to any creative research, fashion design activities tend to be difficult to generalize or quantify because of the characteristics of creativity. Creative design is valuable only when the activities are original and incomparable. As such, understanding the design process is necessary. Creativity researchers Gruber and Wallace (1999) insisted that the case study is the best and only approach to capture thoroughly the unique quality of the creator and creativity. However, based on the results of this study, a new framework could be devised for forthcoming studies.

Understanding the designer’s sketching process will help identify design knowledge, which is used during the idea development process and ultimately triggers generation of creative ideas. The participant designer was aware of when, what, and how he wanted to design the outfits through the sketches. He clearly saw what he wanted to pursue and when to end the process, influenced by his years of experience. Both practitioners and teachers, or even designers, who seek improvement may benefit from this design knowledge. Future studies could focus on developing a system for analyzing one’s own sketches, which could influence the development method for teaching design.
References


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