

# EXPERIENCING USER OPERATION BEYOND THE FIRST METAPHORICAL IMPRESSION CASE STUDIES ON METAPHORICAL PRODUCTS

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## ABSTRACT

In this study we are concerned with user operation in product design and try to explore its metaphorical expressions followed by applying it to design education. First of all, we review three types of user operation to expound their indexical associations with the user's first visual impression. Then, we conducted a design course for master's students. These students were guided to complete creative lamp design concepts. They illustrated how special and interesting ideas can come out of a focus on expressions of user operation. After the initial analysis, we found that it's not easy for students to create reasonable ideas under the common context of user operation. Furthermore, we took Grounded Theory as the research method and then conducted in-depth interviews with sound recordings to investigate professional opinions and suggestions on user experience of operating these design works. We chose six students' lamp designs as the stimuli and recruited three Taiwanese senior design practitioners with at least six years of professional experience. Each design expert was guided to express their ideas regarding applying these design skills to go beyond the first metaphorical expression. The oral comments during the interviews were transcribed into text files and were analysed by the qualitative data analysis software. Finally, we found out five typical factors of metaphorical user operation - detection, safety, ritualization, intuitive, and effect after operation.

*Keywords:* user experience, user operation, metaphor, design education

## **1. INTRODUCTION**

Many designers are often trying to pay considerable attention to user experience design, instead of focusing only on product form and function. When user experience designs become popular, the expressions of product form, function and operation followed by the consequent cognitive and emotional effects should not be ignored (Desmet, & Hekkert, 2007). Originally, the form of product design and its expression resemble those of language (Krippendorff, 2006). Product semantics plays an important role in offering designers new meaningful forms to convey information. In product semantics, product form is the very basic element and offers users an initial sensation or perception. Its expression usually borrows the images from other things (Lakoff & Johnson, 1980), according to reasonable visual clues. These expressions including metaphor, simile, and metonymy all originated from linguistics. They have been applied continuously into industrial design. Nowadays however, it is not enough to only explore the expressions of product form. Operation, another key factor of user experience design, should be discussed more widely. Especially in metaphorical product design, creative or conventional ways to operate product are both somewhat paradoxical under the first impression of new product appearances. In order to clarify these characteristics and the effects of user operation in metaphorical product design, this study tries to represent an analysis of typical factors of metaphorical user operation.

## **2. WORKSHOP OF METAPHORICAL USER OPERATION**

Considering that “form defines expression” is the basic characteristics of interaction design (Hallnäs, 2011), we have tried to illustrate the forms of user operation, and to explore how deep metaphors can be applied to expression of user operation (Cheng, Hsu, & Lin, 2016). By borrowing the figurative concept, we also have proposed three metaphorical forms of user operation, including consecutive, clued, and juxtaposed user operation (Lin & Cheng, 2014). These forms refer to metaphor, simile, and metonymy, respectively. Among them, first of all, the key point of consecutive user operation is the typical operations carried out by following existing conventions. Second, the clued user operation is elicited from a strong visual clue offered by product appearance. Third, the juxtaposed user operation stresses to superimpose the image or component and operate it in a defamiliarized way (Lin & Cheng, 2014). In order to examine how far these metaphorical user operations can go beyond the first metaphorical expression, we conducted a metaphorical lamp design workshop.

We recruited sixteen master’s students (6 males and 10 females) to participate in a design course and assigned them to apply the three metaphorical manners mentioned above to develop lamp design. The course included lectures, a warm-up exercise through brainstorming, sketching concepts, and a final presentation. After the process of brainstorming, students

gathered more than 300 concepts. Then, each student was assigned to design two metaphorical lamp. Consequently, there were 32 design concepts finished after the workshop. More design concepts refers to clued user operation, and less concepts are about consecutive user operation. This outcome reveals that it is easier for students to create a totally new shape followed by the consequent operation than to create a meaningful shape under the conventional operation.

### 3. INTERVIEW

In order to gather knowledge about design expert's comments and opinions on application of metaphorical user operation, we conducted in-depth interviews with sound recordings. The interviews uses student's design works from workshop as stimuli (two works per type of user operation). Three Taiwanese design practitioners (including one freelancer and two design managers) with at least six years (more than twelve years in average) of professional experiences (see Table 1) were recruited to evaluate student's works and to make suggestions on the application of three forms of metaphorical user operation.

**Table 1:** The identity of interviewees

Interviewees	Expert 1	Expert 2	Expert 3
Gender (Age)	M(35)	M(36)	M(49)
Year of working experience	6	10	22
Position	Freelancer	Design manager	Senior design manager

#### 3.1. Stimuli

Six lamp designs belonging respectively to three types of metaphorical user operation were chosen as the stimuli. The first stimulus of consecutive user operation is Basin-upside-down Lamp (Figure 1). It is based on the association between releasing the plug of a washbasin with a chain and pulling the pull-cord of a suspension lamp. The designer borrowed the image of an upside-down basin to write a special story in which light seems to spill out like water. The second stimulus, Volume Light (Figure 2), represents the great consistency between a volume knob and a lamp dimmer, in the aspect of user operation. Furthermore, the designer completed the story by choosing the icon of sound wave to make the lighting area able to change size.



Figure 1: Stimulus 1, Basin-upside-down Lamp, Ching-Hsun Chen

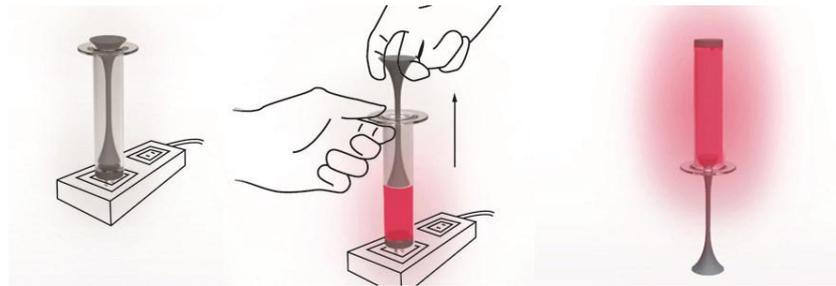


Figure 2: Stimulus 2, Volume Light, Che-Jung Chang

The third stimulus of clued user operation is Spray Lamp (Figure 3). It consists of a spray-can-shaped body and a transparent lid. It can charge energy by shaking its body and turn on after user takes the lid off and pushes the nozzle. In other words, besides borrowing the appearance of spray can, the designer chose the very operation of spraying paint to accentuate the connection between product appearance and user operation. Another stimulus, Extract! (Figure 4), also deeply mimics the appearance and operation from the same image - syringe. This concept is to extract energy from the electrical outlet. The visual clue can lead us strongly to pull the plunger. Then we will see the illumination in the transparent tube get longer and longer until it is unplugged from the outlet and reveals the image of a candle.

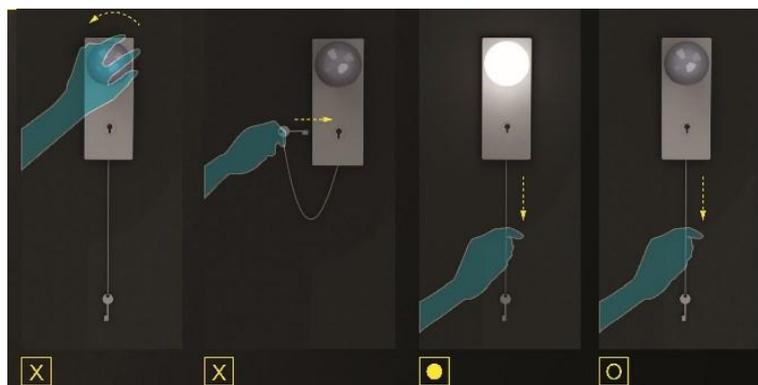


Figure 3: Stimulus 3, Spray Lamp, Sheng-Yu Li



**Figure 4:** Stimulus 4, Extract! by Yen-Hsiang Huang

The first stimulus of juxtaposed user operation is Doorknob Lamp (Figure 5). It is a wall lamp of which the light bulb is similar to a doorknob. We can switch it on and off only by pulling the cord. Moreover, the designer used a key tied to the cord to superimpose the concept that it should be put into the keyhole. Users may find that they were intentionally guided to detour a simple operation. Another stimulus of juxtaposed operation is Bloom Lamp (Figure 6). It comprises a vase-like main part and a watering-pot-like component. The designer tries to express the special transition from one movement to another for telling a common story, and she deploys a LED screen to display the image of a blooming flower on the underneath side of the “watering pot.” Users may intuitively lift up the “watering pot,” as if to water, followed by feeling confused. Then, users may find out the special expression that the “watering pot” can be connected to the “vase” and show a shiny blooming flower on the underneath side.



**Figure 5:** Stimulus 5, Doorknob Lamp, Yen-Ju Lai



**Figure 6:** Stimulus 6, Bloom Lamp, Chia-Ying Lin

### **3.2. Procedure**

All six stimuli were printed on A4 size papers and revealed totally to each design expert (Figure 7). Interviewer introduced these six concepts to each expert, ordered according to the form of user operation: consecutive, clued, and juxtaposed user operation. Interviewees were asked about their opinions on the six stimuli, any feedback to improve the three forms of metaphorical expressions, and whether these skills can be applied into the design industry. Each expert, on average, spent about 30 minutes on the whole process. The processes were recorded and their oral comments during the interviews were transcribed into text files.



**Figure 7:** Interview the second design expert.

### **3.3. Analysis method**

All text files were imported into the qualitative research software NVivo. NVivo's flexible option of "Free Nodes" was applied for open coding, followed by arranging them into "Tree Nodes" for axial coding. The opinions and feedbacks of design experts were organized into a hierarchy to reveal the typical factors of applying these metaphorical design skills. Finally, for proceeding with the final selective coding process in grounded theory (Strauss & Corbin, 1990; Glaser & Strauss, 1999), the "Matrix Coding Query" was used to check the degree of overlapping between the "Tree Node" selected as the crucial axis and other "Free Nodes."

## 4. RESULTS

### 4.1. General response

After the process of open coding through using "Free Nodes," every code of encoded sentence was grouped with similar codes of sentences and given an appropriate name to represent the concept of the comments. For example, a comment like "The design of this switch adopts a humor code for integrating the behavior of energy saving and the concept of carbon reduction" (Expert 2) was coded as "code for integrating," and one such as "Strictly speaking, the code of this concept is transformed from our existing experience." (Expert 3) was coded as "transformed code." Both comments were then integrated to form a new code category, "Transformation of signifier." After the open codes were revised, 96 coding categories were deduced from 322 references of sentences. Then, similar open codes were integrated and turned into axis codes by using "Tree Nodes." Based on the data calculated and shown in Table 2, it is obvious that the numbers of the coding references in the first level of axial coding are different. Among all four axes, the number of references in "design language" is highest, and the number for "design education" is the lowest. Among all second-level axis codes, the numbers of "signifier" (52 reference sentences) and "branding & marketing" (40 reference sentences) are the highest. On the axis code of "interaction & operation," the "effect after operation" (27 reference sentences) is more often mentioned by experts; whereas "pursuing innovation" (20 reference sentences) is the most notable code on "design education" axis

**Table 2:** The main hierarchy of axial codes and the distribution of 322 references of sentences.

The first level	The second level	Number of reference sentences
Interaction & operation  (17 open codes from 66 references)	Detection	7
	Safety of operation	6
	Ritualization	14
	Intuitive operation	12
	Effect after operation	27
Design industry  (28 open codes from 83 references)	UX design	8
	Taiwan design industry trends	11
	Consideration of technology	15
	Branding and marketing	40
	Product development	9
Design education  (12 open codes from 43 references)	Responsibility of supervisor	7
	Personal attribute of designer	3
	Training of designer	5
	Connection with industry	8
	Pursuing innovation	20
Design language  (39 open codes from 130 references)	Attribute of design language	27
	Product identification	4
	Signifier	52
	Design expression	22
	Consideration of experience	25

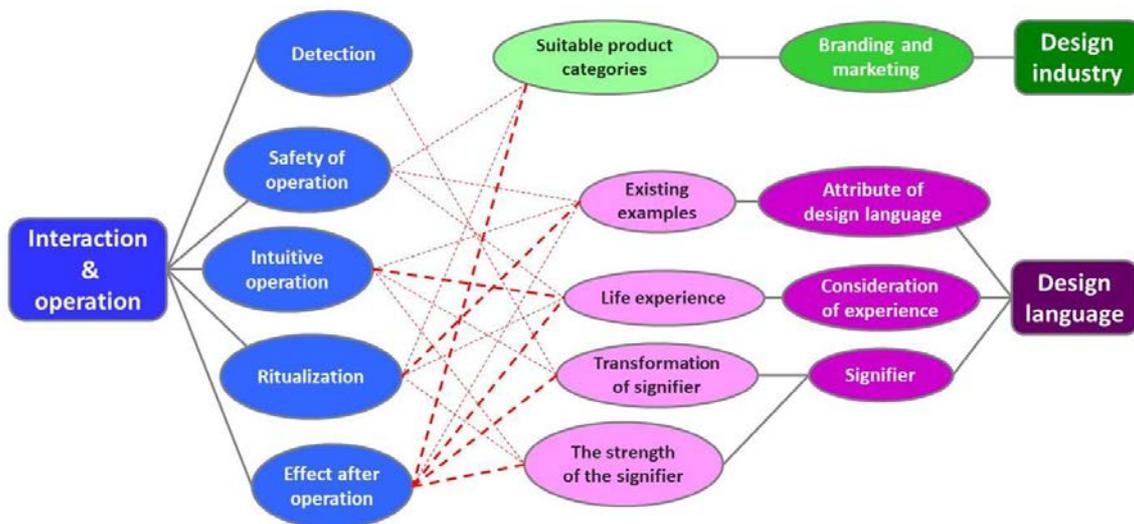
#### 4.2. Examining the context of metaphorical user operation

In this study, metaphorical user operation is the most crucial factor. For this reason, the axial code “interaction & operation” will certainly be the very selective code. For further examining the context of metaphorical user operation, the option of “Matrix Coding Query” in Nvivo was applied to find out other codes having reference sentences which overlapped with the codes under the axial code of “interaction & operation.” Consequently, concepts related to

“interaction & operation” emerged (Table 3). For example, a comparison between “intuitive operation” (under “interaction & operation”) and “life experience” (under “consideration of experience”) indicates that intuitiveness of user operation is based on the user’s life experiences and may be able to strengthen or weaken its effect when encountering different user groups. Comparing “effect after operation” (the second-level selective code) with “the strength of the signifier” (under “signifier”) reveals that user operation and the consequent effect are influenced by the strength of the signifier designers used. Finally, we found out five crucial concepts related to metaphorical user operation: life experience, the strength of the signifier, existing examples, transformation of signifier, and suitable product categories. Furthermore, the context of the selective code “interaction & operation” is illustrated (Figure 8) and shows that “design language” is much closer to this selective code than the other axial codes do.

**Table 3:** The open codes in connection with “Interaction & Operation.”

The related open codes	The second level of axial codes	Number of overlapped sentences
Life experience	Consideration of experience	8
The strength of the signifier	Signifier	6
Existing examples	Attribute of design language	5
Transformation of signifier	Signifier	4
Suitable product categories	Branding and marketing	4



**Figure 8:** The hierarchical context of metaphorical user operation. Rounded rectangles represent the first-level axial codes, whereas ovals represent the second-level and third-level axial codes. Solid lines delineate the hierarchy of axis codes; dotted lines signify the connections across different axes, and the thicker dotted lines indicate the stronger links.

## 5. DISCUSSION

This study represents speculative design regarding metaphorical user operation. According to the analyses above, we tried to make some points clearer. First, we found that the appraisal patterns of emotions (e.g., Demir, Desmet, and Hekkert, 2009) still play important roles in experiencing metaphorical user operation (e.g., “effect after operation” under the selective code). Second, design language including applying signifiers to arouse user’s life experience is able to be associated with the intuitive operation, the ritualized behaviour, and the consequent effect. Third, designers need to be concerned about the concepts of branding and marketing when they try to apply metaphorical user operation to product development. Fourth, safety is the required factor for some product categories in which user operation should avoid too much trial and error, but it is not for all products. Therefore, metaphorical user operation can at least be an access made applicable to the majority of cultural creative designs or products that need not require high safety. Building on the initial findings of this study, further and wider investigations will be carried out in the near future to find out more details of metaphorical user operation.

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