The Use of Light Elements in Three-Dimensional Composition

-- A Case Study of Curriculum Design of "Three-Dimensional Composition" in Industrial Design Major

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Abstract

In this paper, the curriculum design of "Three-Dimensional Composition" of industrial design major is combined: the light element is separated from the environmental element; the single intensive training is carried out in the curriculum, which further provokes students’ thinking about the form transmission of the product under the light environment. A new perspective is introduced to interpret and examine form for students via the specific "light" and "form" training.

Keywords

Three-dimensional composition; Light; Paper three-dimensional; Form.

1. Introduction

The image transmission of things depends on space. As a building with large design, there is "building is a game of space and light." As far as industrial design is concerned, "space" and "light" are also cut-and-dried topic. In form design, the image transmission is not only affected by the form, material, color, texture and other elements, the light environment in which it is located will also produce a positive or negative effect on it. Throughout the various elements of the environment, the influence of light on form is the first. This paper will combine the curriculum design of the "Three-Dimensional Composition" of the industrial design major: the light element is separated from the environmental elements, and individual intensive training is carried out in the paper three-dimensional modeling, so as to provoke students' thinking about the image transmission of the product under light environment. It aims to introduce a new perspective to interpret and examine form for students.

2. Light Element and Three-Dimensional Composition

The three-dimensional composition is one of the basic curriculum of design, and it aims to cultivate and train students’ space thinking ability via the rules of formal beauty and the basic laws of three-dimensional modeling. The core is to disassemble objects in "bulk" way, and it is the only way for students to move from a two-dimensional plane to a three-dimensional space. Light is one of the important elements that affect people's visual thinking, in this course, light will be the key element throughout the paper three-dimensional design. Namely, the first stage of the curriculum: explain the composition of points, lines, surfaces, and light that stay on the surface. The second stage: explain the aesthetic concepts such as metaphysical pace, rhythm, opposition, and unity. The light is used to as the entry point to find a new angle to examine the design form. Focusing on the utility of light, when conducting form aesthetics, it does not stay at a single level of permutation and combination, and it is necessary to consider what kind of form and meaning of the form, material, color, and texture under the interaction with light
present in the space. In allusion to this interaction, progressive thinking is conducted, so as to establish the aesthetic concept of space.

3. Curriculum Design Based on Light Element

"Viewing form from light" is the core of this curriculum design. The three-dimensional composition in the context of light is not only a training of space modeling ability, but also a grasp of the light and shadow language and the aesthetic exploration of space form. In order to be easy to compare, white A4 paper is used as the material in this curriculum practice. For every light control, lighting, etc., students are required to take photos and record, and analyze the reasons, make students complete the design process from cognition to construction and then to cognition.

The total class hours of "Three-Dimensional Composition" is 48 hours, and the three-dimensional part of paper makes up 16 hours: there are a total of 4 hours of practice 1, they as the transition of the pre-curriculum plane composition, basic sketch, etc., help students successfully complete the transformation of thinking from plane to three-dimensional; there are a total of 4 hours of practice 2, it is an extension of practice 1, it emphasizes the control of light and shadow effects; there is a total of 8 hours of practice 3, it is an improvement of practice 1 and 2, and requires students to use light to express emotions.

1. Practice 1: Static Expression under Fixed-Point One-Sided Light

Purpose and requirements: 10X10cm white paper is used to conduct semi-three-dimensional works by cutting, folding and other methods based on the plane composition, complete the transition from plane composition to three-dimensional composition. By changing the illumination angle of the external light source, we can experience the difference in the transmission of form and image, and pave the way for the practice 2.

The contrast between light and shade is the most expressive composition way and the most commonly used method of processing three-dimensional space. The volume of the form depends on the contrast between light and shade. There is a huge difference in the light and shade effects of form planes and line outlines in essence. The students observe the light and shade of the shadow and the size of the form area, and the influence on the transmission of the form volume, experience the utility of light as a design element. In practice, starting from the selection and design of the plan, students are required to predict the possible interactive effects of light, and then conduct lighting processing. The key point of practice is to compare the processing of light with the knowledge of light and dark surfaces in sketches, and experience the influence of light from different angles on the form and body perception. Each fold and cut is not only the plane improvement of the paper, but also the beginning of light and shade modeling. The whole process of form design from plane to three-dimensional in the interaction with light is completed; it is also an expansion of students’ space modeling ability.

2. Practice 2: Dynamic expression under movable one-sided light

Figure 1. Students’ works
Purpose and requirements: 10X10cm white paper is used to freely create semi-dimensional works by cutting, folding, etc., the light should be considered an element when modeling, highlight the effect of light and shadow on image transmission.

Students have a preliminary understanding for the concept of light element modeling via practice 1. Therefore, in practice 2, students are required to independently creatively make paper semi-three-dimensional, and consider the light element as an important component. Namely, by giving the semi-dimensional appropriate movable external light source (single-side light) irradiation, make it produce projection. The light and the semi-three-dimensional form together form a unified dynamic whole, it is no longer a simple element to set the overall sense in practice 1, but an important component of the image. Namely, the finished works is a dynamic shape composed of paper and light.

3. Practice 3: theme performance based on light elements
Purpose and requirements: students go to the school gate alone to observe the crowds and traffic (at least 25 minutes) and refine their inner feelings for make paper three-dimensional works, the design focuses on the dynamic expression of light elements and experience the influence of light elements on emotional cognition. There is no limit to the way of making paper materials.

Light is closely related to human emotional cognition. Combining the relevant knowledge of "Design Psychology", the practical focus is directed to the influence of light elements on emotional cognition, and light becomes an effective element of expressing emotions in form. After the works is completed, students are required to reflect and examine: whether the full three-dimensional works demonstrate the original intention of the design, and what role does the light element play in it and have what effect.

Students showed great enthusiasm for practice 3, Figure.2 is the student work "Thinking", the works attempts to express the helpless and incompetent mind when facing many choices. The facial shapes, eyes and cheekbones details of the characters in the work, and the mottled paper material processing (shaped with pulp and paste), all reflect the author's complex heart. The light processing of students is emotional, the clever flickering light effect makes the mottle more mottled, and the calm and deep feeling comes out. This works perfectly expresses the theme in skill and conception. As long as students perceive with heart and obey this perception in creation, the modeling will be handy.

Figure 2. Students' work "Thinking"

Figure.3 shows the students' work "Dream", the students conduct the following exposition on the theme: lost in the dream, at the age of 20, people should make progress, seek dreams, and pursue dreams. What is worth mentioning in the work is that the students take the shadow of the works as the continuation of the overall form: under the static light, there is real ladder in the front for people to move up, and the dream ladder in the back makes people work hard. Under dynamic lighting, the light source moves slowly from top to bottom, and the figure silhouette shows the dynamic effect of climbing from bottom to top. The light form with front
and back, real and imaginary, static and moving can be truly experienced, and its ingenuity is worthy of praise.

Figure 3. Students’ work “Dream”

4. Conclusion

The industrial design is a statement of product function based on form, color, and texture, this statement is completed by the interaction between people and products. Space provides the stage for the occurrence and development of interaction. Throughout the various elements of space, the influence of light on product form is the first. Therefore, it is very necessary to consider the influence of light on the form in the "Three-Dimensional Composition" at the early stage of form learning.

Light itself does not have form, but the interaction between light and form can produce the beauty of reality and reality: on the one hand, alternating light and dark, the smart and interesting light and shadow not only enrich the form, but also make it have more layers. On the other hand, perceiving a form actually perceives the interactive relationship between light and form in space. The result of the interaction will affect people's visual judgment and emotional cognition for the form. In the three-dimensional composition, the addition of light elements is a perceptual addition to the rational form. In the aesthetics of form, the care for the light element o is to understand and appreciate the rational form from a more humanistic perspective. Light continuously connects space and form. Here, light becomes a kind of "material" for image transmission.

The exploratory and research teaching methods represent a direction of design education, the whole course design aims to inspire students, hopes to use the power of "light" to arouse students’ design ability. The three design practices organically link the independent design links via light elements; each practice link starts from observation, stay and shape with light, and ends with reflection on light and form, and light and intention. The importance of light for form shaping is implemented and emphasized, as well as the importance of form aesthetics under the light environment. It also lays the foundation for further design learning in the future via specific "light" and "shape" training.

References

