The visual expression of strength in product form design

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Abstract. The visualization of power is an important part of the semantic expression in product form design. Take visual as the pointcut, the structure, color, material and emotion are infiltrated into the design of the product appearance. By considering the design factors such as structure, color and material, and applying these factors to the design of product form reasonably, the product will have beautiful shape and more reasonable functions.

1. Introduction
The visualization of power comes from the book Rhetoric of Design\textsuperscript{[1]}. Things can be seen everywhere in lives all show the power of nature in a certain structure and rules. Such as fierce wind, rainstorm, hail and earthquake are the concrete manifestation of the power of nature. Since the beginning of human consciousness, people have started to explore the power of nature in many ways. They apply the rules which they got from explore to production and life, it is helpful for people to improve their life experience. Therefore, when power is expressed in product form design, it should follow the rationality of mechanics, coordinate beauty and rationality, shape and function, and endow products with emotional power.

2. The visual cognition of power in product form design
Products are the mediums of communication between people, people and things, and people and the environment. They can convey different semantic information to users through appearance, which show the following characteristics: self-evident, self-instruction and semantic migrating use etc. A product, user can get the basic information, use, usage merely through its appearance. Also emotional information which product want to convey.

The external form of the product can give the user the most intuitive visual experience, and the information transmitted by different forms is slightly different. The product form of straight edge and right Angle presents simple mechanical aesthetic feeling or cold and elegant feeling; the plump product form is soft and intimate. Every function key of production, its distribution position, distribution mode, size, shape, colour, etc., will bring inspiration to the user's functional hints and operation modes. In addition, the change in the thickness of the external form of the product can be shown as the static or dynamic state of the product, the curve change shows the hardness or softness of the product, and the temperature of the colour reflects the stability or liveliness of the product \textsuperscript{[2]}.

The spiral structure of the pine cone makes people feel happy, and we feel positive vitality from its shape. The appearance of aircraft and automobile is mainly based on streamlined structure, which not only meets the requirements of beautiful appearance, but also solves the mechanical problems under
the condition of high-speed driving. The sense of strength of product is showed by different expressional gimmick: the curve of its configuration straight, radius, coarse and smooth, the light and shade of colour collocation. When the structure and characteristics of products meet people's potential affection needs in visual balance, people will have a sense of pleasure. Therefore, the visual expression of power includes four aspects: the rationality of product structure design; the aesthetic expression of product colour; the rational choice of product material and the semantic transfer of emotion.

3. The visual expression of strength

3.1. Rationality of structural design

The products that make users satisfied and delight to use are not only the external beauty of the products, but also the overall beauty of the structure, color, function, material etc.. Whether the product is reasonable depends on the needs of users, in addition to the beautiful appearance of the form, but fully considering the internal structure of the product, ergonomic design principles and safety problem in the process of use. When the size and operation mode of the product can not conform to the user's habits, the satisfaction of user's experience will be reduced. Therefore, before designing a product, it is necessary to conduct a large number of user surveys, analyze the relevant structure knowledge system, and propose a reasonable solution to solve a certain problem. For example, the shapes of the hand tools are designed with the human hand structure as the reference and combines various functional characteristics of the hand to design, so that users can have a comfortable experience.

The product form includes the internal structure and external structure of the product [3], and the internal and external cooperation to form the whole product. The mainly structure in traditional Chinese furniture design is mortise and tenon joint structure. Each part is mutually compatible and flexible. This kind of furniture is also convenient for disassembly and combination during transportation. Like lot of furniture of Ming dynasty, woodiness is hard, the cent body that will alternate among each other makes up whole, when some among them is damaged, facilitate repair and change, although structure of this kind of furniture is flexible, but sedate, unvarnished however. IKEA has a mobile phone bracket as shown in Figure 1. The mobile phone bracket is mainly made of wood, and the traditional mortise and tenon structure is adroitly applied to the design of modern products. The reasonable structure shows the stability and strength of the product.

![Figure 1. Mobile phone holder.](image)

3.2. The color design of product

Color is one of the visual expressions of strength. Matching the color of the product clever can bring different emotional experiences to the user and arouse people's different inner emotions. Positive emotional color can stimulate people to accept the outside information, which will attract the attention of consumers, and then generate purchase behavior [4]. Nature is rich in color, dark color are heavy; and light colors reflects lightness. The power that color gives a person is reflected in the feeling of people towards temperature, weight, distance which different colors generated. The warm colors such
as red and yellow make people easy to reminiscent of the sun, creating a hot and warm feeling, and that color easily brings people happy emotions. Cold colors such as green, green and blue evoke people's association with the sea and the shade of trees, leading to a sense of cold and loneliness, and easily leading to melancholy. The lightness of color affects people's judgment of weight. Warm colors with strong color have a sense of weight, while cool colors with weak color have a sense of lightness. The dark color is heavy and the light color is light. For example, the lower part of the mechanical equipment mostly uses black and gray to increase the sense of stability of the product, and the upper part is mostly white which color gives people a light sense. The sense of distance that color gives people will affect the importance of different parts of the product in people's mind. Generally, the warm color with high brightness will have a sense of expansion, and there will be a sense of proximity in the distance. The cold colors with low brightness will have a sense of contraction, and the distance will give people a sense of distance.

In the color application of the product, the color gradation of the same color system or different color systems are unified, which will bring a sense of harmony to the whole product and achieve a unified visual in experience. As shown in figure 2, this series of poisonous mushroom furniture has bright and vivid colors for each individual product. Although the colors are gorgeous, the grayscale is highly unified, and the furniture also has a sense of harmony when put together. Besides, each single product has a round shape, bringing pleasure to users. Black, white, grey and silver can make people think of metal, industry and bring people hard and cold power. Blue is the color of the sky and the sea. It means deep, calm, and rational, and it can bring a serene and broad visual experience. Especially blue and white match each other, it will show a clear and refreshing feeling to people, giving them a psychological high-tech sense. According to the use environment and occasion of the product, with different colors, can add vitality to the product and market competitiveness.

3.3. Material performance of the product
Material is one of the important elements for the perception of the external strength of a product. It combines human vision and tactile elements to bring users a rich emotional experience in the process of using the product. Artificial material such as metal, glass contains the feeling of science and technology and fashionable feeling, and the intimacy that wood, cloth and stone reflects a nature and comfortable feeling. According to the different materials, the power and emotional experience presented to the user is also different, such as: bulky and light, smooth and rough, gorgeous and elegant, hard and soft, warm and cold etc.. The combination of natural and fresh wood and industrial metal not only gives the product a sense of stability, but also makes the cold metal appear soft.

The combination of simple ceramics and natural wood enables us to enjoy a slow pace of beauty in the fast-paced modern life. The chair that make up with soft spin material and natural wood, giving people warm and steady feeling. The combination of metal and plastic, let the product produce a kind
of modern sense and high-tech, bring users a sense of refreshing visual. Therefore, the reasonable collocation of different product materials presents different visual impact.

The Japanese design starts with the essence of the product, eliminating all unnecessary processing and color, and simply leaving the material itself and the function, so that the user can get a return to the aesthetic experience. The design by Naoto Fukasawa is called "Lamp with tray", which is simple in appearance and combines different geometric shapes with unified colors. The base part of desk lamp is a tray, the purpose is to satisfy the behavior that user conveniently places key or purse when user get home. When the tray feels the gravity, it will light up by itself, giving the user a warm feeling. When the gravity disappears, the lamp will dim accordingly. This kind of interactive means, such as gesture, sound and smell, not only makes people feel interesting, but also is a natural and intuitive interactive form. This kind of unconscious behavior into visible design, can grasp the user's inner perception of power, will win more market.

3.4. emotional semantic transfer of product form
The user's favorable impression of the product is derived from its nifty shape, intimate copy writing and interesting cartoons, but actually it is the change in the emotional experience brought by the details to consumers. The design case of the match by Kaoru Mende, which is inspired by the scattered branches on the ground, and used the scattered branches as the basic shape of matches. The shape of the small branches that fall to the ground is beautiful, and the redesign can arouse people's impression of nature, fire and everything in the world, and they can do something before returning to the nature. When people use matches, every time they open the match box, it will be a wonderful experience. This kind of original and ecological tree-like matches can convey people's feeling of getting close to nature.

Accordingly, product configuration that makes user satisfactory should be full of interest. The form of this kind of product is to apply the organic form in nature to the design of the external form of the product through the method of personification, exaggeration, combination, segmentation and other methods, so as to inject new vitality into the product. The popularization of modern new materials, new technologies and new processes enables the production of more interesting and abstract product forms, and brings more choices for users. When we see an airplane, we will think of birds flying freely in the sky. When seeing the black and white stripes, it is easy to think of the shape of zebra. These products, which can arouse users' imagination, have certain symbolic and suggestive functions. The natural sphere, for example, presents a round, soft and lovely state without any external factors. Therefore, the shape with the sphere as the basic element naturally brings the user a sense of intimacy and easy acceptance. At the same time, the ball is the product of the same volume of the most material saving shape, simple structure, reduce the number of product parts. In the design of children's products, it is often used in the form of roundness, which conveys a safe, friendly information and conforms to children's cognitive psychology.

4. Conclusion
Contemporary consumers attach importance to the satisfaction of user experience and emotional needs. Beautiful and easy-to-use products can increase users' happiness. A good product will have a reasonable structure, harmonized shape and function, beauty and rationality. Therefore, through the research of the product's structure, color, material and emotional information, it can enrich the designer’s method to optimize the design of product form, and make the product design more humanized and more socially serviceable.

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