

The Relationship Between Morphological Basis and Product Design

Haiyan Xie

School of Art and Design
Zhuhai College of Jilin University
Zhuhai, China 519041

Abstract—Morphosis is an important basic course for art design. The plane and three-dimensional factors together constitute its main research content. It is an important course that must be studied in industrial design, interior design, fashion design and other art design majors, literature majors (advertising design, publishing design). Morphosis is also an important basis for product design, internal structure, and design thinking training in product design. It is a major research content of this paper to use the correct knowledge of the composition of the form to design the product reasonably and beautifully.

Keywords—*form; morphosis; product design; creative thinking*

I. INTRODUCTION

Morphosis is a basic training course in the design course. Through the cognition of form, using the methods of re-dissolving, constituting and combining to inspire students' design thinking, exercise students' imagination and hands-on ability, cultivate students' ability to analyze form rationally and use analysis results to accurately create performance, making students have a deeper understanding of the creation and aesthetics of the shape in the design, and have a strong ability to analyze and understand the internal structure and external structure of the form, so that the products designed by the students are beautiful in appearance and reasonable in structure.

II. MORPHOSIS AND PRODUCT DESIGN

A. Form

Form is a technical term used in the art design industry. It is the study of the image of objects in the visual category. The form includes two concepts, shape and emotion, including internal and external shapes. In the study of morphosis, many students tend to study more about external forms and ignore the study of internal forms. In product design, the importance of the internal structure is as important as the external shape, and a product design can be

*Fund Project: The method of illustrator picture book creation and the research of psychological impact on specific people, 2016GXJK202, Guangdong province innovation and strong school project of 2016 (provincial key platform and major scientific research project), education and research projects.

completed with the coordination of the two contents.

The modality is a psychological process that belongs to the inner activity of the human being. The form, that is, the psychological influence produced by the shape. In the process of ever-changing and different forms of research, it has a strong and extensive nature, which not only provides a lot of research and reference for product design. It is also an important basic course for students majoring in fashion design, interior design and architectural design before they can study professional courses.

In the classification of morphology, the morphology can be divided into: artificial form and natural form. Natural form is a form that naturally forms in life, such as trees, animals, plants, and so on. The artificial form refers to a form in which people artificially design and use suitable materials, techniques, and the like in order to achieve a certain purpose. The artificial form of thinking is to summarize and organize the existing forms in life. The artificial form formation thinking method is a form in which the artificial forms collected in the natural world are disassembled and geometrically classified, and then these are disassembled. The real estate, clothing, furniture, and electronic products in life are all artificial. As a form of artificial creation, industrial products are artificially manufactured to meet people's needs. The artificial form is divided into internal form and external form. The internal form is expressed by means of materials, structures, processes, etc., and the internal form is the basis of the form of the appearance of the production department. Different materials, different structures, and different processes can produce different external forms. Therefore, in the study of morphological composition, although the external form can be directly presented in the viewer's vision, it cannot be blindly understood as a single external form. The analysis and composition of the internal form can have a significant impact on the external form if it is not sufficiently accurate.

Under the premise that the technical means, materials, processes and functions are similar in the same type of products, the strength of product competitiveness is determined by the external form. One of the main contents of product design research is to ensure that the external form conforms to the aesthetics of modern people under the premise that meet the functional requirements of products. In this way, it can make it more competitive in appearance. The

external form is the content of visual communication design research, which requires certain social constraints, nationality and regional characteristics. Under the premise of reasonable internal structure, the designer needs to have accurate and aesthetically conscious creative ability for the external form. This kind of creation can be said to be ever-changing, but it is based on the use function and aesthetic needs of the crowd.

The difference in the external appearance of the product comes from the designer's own aesthetic, which is the performance of the designer's creative thinking in product design. It is realized by the combination of the expression of morphological language such as point, line, surface, color, texture, body block, light and shadow with materials, structure and process. The internal and external forms of the product are mutually restricted and interconnected.

The whole process of product design requires designers to understand relatively comprehensive knowledge, and also requires designers to have a broader thinking and creative thinking in the design process. Product design needs to establish a preliminary design with aesthetics based on aesthetic needs (the designer's cognitive needs for the target population), and to improve product design in terms of morphological analysis (formation of form and form of beauty), rational structural analysis, and technical processing techniques. Therefore, whether it is an art design discipline or an engineering discipline, in the process of designing a product, it is necessary not only to have a good ability of rational analysis, but also to study the content of morphological aesthetics according to the aesthetics of form. In this way, the product can meet the needs of people in the market.

B. Composition

It constitutes a role for students to inspire thinking and concept transmission before entering the professional curriculum. Since the Bauhaus School of Design first established three basic design courses, the research and innovation of points, lines, faces, blocks, colors, and space have laid a solid foundation for modern composition. The composition is a modern word, which is a proper noun. It refers to the formation and creation. It combines the shapes, light, colors and body elements into new and beautiful forms according to certain rules. What it takes students to master is the ability to decompose, reconstruct, break up, abstract, and refine the figurative form. In the process of this ability exercise, students should learn to use the law of form beauty to clarify the following contents (some parts cannot be understood as a simple constitutive rule, here emphasizing on the process of design by using morphosis).

The shape of any product can be decomposed into a combination of several morphological elements, and the composition rules can be found. The traditional composition includes three aspects of plane composition, color composition and three-dimensional composition, which are also called three major components. The three major components are the theoretical basis not only for industrial modeling design, but also for other design directions.

1) *How to compare*: Contrast and unity are the basic rules of morphosis. Students are relatively better at understanding the contrast and other rules when constructing training. The difficulty lies in how to use the basic methods and basic rules of morphosis in the design to make the contrast and unified elements to the extreme and accurate. In the process of plane-to-stereoscopic visual form transformation, students must experience the understanding process from points, lines on surface to the three-dimensional points, lines, faces and bodies. In this process, students should use various forms of composition to combine and reconstruct in a general form. For example, line shape and face shape can be compared as two elements. How to reasonably use the sense of color and three-dimensional composition and even the elements such as light and shadow to maximize the speed, lightness and stability of the line. Whether a black line is combined with a white surface or a white line is combined with a black surface. It is conceivable which effect can achieve the contrast enhancement.

In product design, the contrast effect is often applied to some key structures. This outstanding structure or function requires the designer to skillfully convey the main structural information highlighted in the law through comparison.

2) *How to unify*: Unification is the integration of various elements, looking for a common, similar way to form a whole. This process makes most of the elements in the design coordinated and holistic. These rules of unity need to be conveyed by means of approximation, repetition, and gradual change. The difficulty in communicating this way is not the understanding of the surface meaning, but how to combine the elements in the planar shape (including the color elements) with the elements of the three-dimensional shape, and then apply them to the product design.

3) *How to use the texture composition to perform*: The texture refers to the formal elements caused by the geometric details of the surface structure, texture, etc. of the material. Due to the different materials, the organization and structure of the surface of the object are different, so the object will produce various textures such as rough, smooth, soft and hard, loose, firm and so on. The texture composition is to reconstitute and design the surface texture of different tissue forms by a certain method. The texture can be divided into visual texture and tactile texture, which are classified from the senses. The division of texture into natural texture and artificial texture is classified from materials. The need for texture in product design requires a degree of sensitivity to various textures. Therefore, the texture of the product design includes not only the visual texture, but also the tactile texture, and the morphosis is the targeted training of visual expression of various textures. The performance of the texture in the product design is directly reflected in the proper texture composition to accurately convey the characteristics of the product, which is impressive and good to use.

III. THE IMPORTANCE OF THINKING CULTIVATION IN THE STUDY OF MORPHOSIS

Product design is a course based on morphological analysis, and the degree of mastery and understanding of morphological composition plays a crucial role in product design performance. In the process of product design, the research content includes not only the form of points, lines, faces and body blocks of external forms, but also the internal structure, the visual impact of internal and external materials on people, and the analysis of the relationship between products and people. These contents have established a good human-oriented product design basic goal. To do this part well, it is necessary to have a good knowledge of composition, material texture, and shape creation.

Whether in the training of form composition or in all design processes, it is necessary to have a process of rational thinking and rational analysis. In the process of product design, in the process of comprehensive consideration of the basic contents of various forms, it is necessary to consider the structure, function, materials, and process. These contents must conform to the modern aesthetic requirements, so this requires product design to consider the social, epochal, productive, and economical aspects of the product based on the sensibility of aesthetics. It also includes skills such as thinking about the internal structure and reconstituting from the function, and thinking about the composition of materials or processing techniques. These skills require a lot of rational analysis to achieve a combination of sensibility and ultimately a design. This rational way of thinking in product design provides a large and more reliable image base for modern industrial product design.

IV. THE IMPORTANT ROLE OF MORPHOSIS IN PRODUCT DESIGN

A. *Composition Is a Link and Bridge from Foundation to Product Design*

In terms of product form design, if the ability to analyze and understand the form depth is developed in the process of morphosis learning, then the product design will play a good role in the product design.

Product design needs to abstract the shape of the image and then retain the feature, and then process the function, shape, material and other content, and finally achieve the needs of people's use, production, but also have a visual aesthetic. This cognition of shape and structure is obtained through training in form composition. Morphosis studies the cognition and application of morphology, and product design is an extension of this application. Therefore, the study of the composition method and composition thinking in the morphosis is a link and bridge for product design.

B. *Product Design Requires the Ability to Geometrically Generalize the Shape*

The importance of the composition method and composition thinking can clarify a point of knowledge: the composition is expressed in terms of expression in terms of abstract expression. If the content expressed by the students

in the process of training is the concrete information in real life, then the direction is wrong. Many different types of products in life, such as cars and home appliances, are designed to break away the natural form of figuration, extract the morphological elements, and finally combine them into new geometric forms. It is precisely because of the abstract nature of the composition that it shows its wide applicability in the design.

These geometric shapes extracted from the figurative form are organically combined to give them the original geometric beauty of the product design. Human form constitutes a more concrete or abstract artificial form element. These morphological elements are the concentrated expression of people's summary of natural forms. Finally, the design concept was perfected by combining the process, structure, materials, etc., and the product design was completed. Therefore, at the beginning of product design, it is necessary to have good geometrical induction.

C. *Analysis and Construction of Internal Structure of Products*

The product structure is divided into an external structure and an internal structure, and the internal structure includes a core structure and a system structure. The internal structure of the product is closely related to the external structure. The process, function and other factors of the product affect its internal structure, and the internal structure is also the basis of the external form. The function of the product determines the internal structure, the appearance of the shape reflects the internal structure, the analysis and construction of the internal structure design of the product, and the design of the external form of the product is closely related. When designing the product shape, it is necessary to meet the functional and structural requirements, but also to perceive the material, but also to improve the overall design, and finally form an aesthetic form that conforms to the product function and shape.

Although the work of structural design and design is separate, these two aspects must be together to complete the product design. That is to say, in the design, it is necessary to understand the internal structure, understand the functional layout, and the internal structure must also conform to the shape of the external design, that requires the two parts of the scheme be coordinated and processed in the scheme design.

The internal structure analysis and construction needs to be analyzed in the morphological composition to form an analysis. In the study of morphological composition, this requires students not only to study the external form, but also to strengthen their understanding of the internal structure.

D. *Materials, Texture and Product Design*

Content training in materials and textures has always been an important part of morphological composition training. In recent years, with the continuous advancement of domestic technology, more and more designers in the design try to design products through various new materials and new technologies, in order to satisfy more and more users' requirements on the use and visual needs of materials. In

teaching, students' understanding of materials, sensitivity to accurate texture and innovation has been trained. For example, in the content of the three-dimensional part, the composition and innovative training of various texture changes expressed by various materials are used to cultivate students to rationally apply materials (gypsum, glass, clay, cardboard, etc.) and textures in product design to complete the human-oriented design standard content.

V. CONCLUSION

A good product design depends on the combination and composition of various modeling elements, aesthetic and reasonable functions, internal and external structures. The improvement of this combination ability and the mastery of the composition need to be trained in a large number of components in the guidance of modern composition theory, and also need to be trained under the premise of combining thinking with rationality and sensibility. The use of modern aesthetic knowledge to improve the aesthetic ability of the styling can lay a good foundation for the completion of a product that meets modern labeling.

REFERENCES

- [1] Cui Hongliang. Research on the basic teaching of product form design with composition thinking as the core. *Art Panorama*. 2017 (in Chinese)
- [2] Kan Fengyan, Deng Cong. Application of geometric shapes in product design [J]. *Design Ideas*, 2019 (03): 60-61 (in Chinese)
- [3] Jiang Xuezhi, Hu Yinghong. Research on the basic teaching of architectural form design with the core of composition thinking[J]. *Journal of Architectural Education in Institutions of Higher Learning*, 2005(03): 34-36. (in Chinese)
- [4] Ma Tao. Material Texture and Texture Analysis in Product Design[J]. *Furniture & Interior Design*, 2016(03):20-21 (in Chinese)