

Industrial product graphic design based on visual communication concept

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Abstract. The development of multimedia information technology and design concept in today's society has made the graphic design to go beyond the scope of the plane to the development of modern science and technology. In view of this, graphic design of industrial products based on visual communication concept was studied. First of all, the application searches graphic design sequence and fuzzy comprehensive evaluation of industrial products. Industrial product graphic design in Guangdong Province was analyzed. The results show that the concept of visual communication is helpful to the expression of industrial product graphic design, and the imagery and association of the audience needs to be taken into account in the design process. This also reveals that Message transmission can be a body of communication, it is possible to communicate between individuals.

Key words. Visual communication, industrial product graphic design.

1. Introduction

With the rapid development of science and technology and people's daily art life, the original printing art design has no longer adapt to the continuous development of the society and the world of human life. Visual communication design emerged. Visual communication design refers to that visual graphic design information is communicated to every person in the society through a variety of media, including aesthetics, design, history, religion, psychology, physics, sociology and literature, which is a new, highly integrated discipline [1]. Visual communication and visual culture have become increasingly important in the role of the image. Image narrative can span the obstacles of language and characters, and it is more likely to attract people's attention. As a result, visual communication design will be a potential and developmental specialty under this trend [2].

Researchers at home and abroad believe that visualization is the trend of the future. Visual communication and visual culture have become increasingly important

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in the role of the image. Image narrative can span the obstacles of language and characters, and it is more likely to attract people's attention. As a result, visual communication design will be a potential and developmental specialty under this trend [3].

In addition, because visual communication design (especially commercial design part) is closely related to marketing, planning and advertising. The concept of visual communication began to be applied to industrial product graphic design. Therefore, the plane-based visual communication design can express and present the design theme with the aid of more and more expression means and concepts of plane and transcendental plane as well as visual and transcendental vision, which is the purpose of this paper [4]. In the information age, in the face of technology change rapidly, knowledge and update, as the visual communication design of the workers and educators, visual communication design is a practical attempt and reflective discussion. Design techniques are updated in a timely manner, the design concept is continuously improved, which is an inevitable choice in the sense of achieving the design realm of extension, transboundary, interaction and experience under the global integration [5].

The remainder of this paper is organized as follows. In the second chapter, the connotation of visual communication design and related concepts of industrial product graphic design based on visual communication are briefly introduced. In Chapter 3, the research methods are introduced. Through the way of looking for industrial products graphic design sequence, fuzzy comprehensive evaluation of industrial product graphic design effect, graphic design of industrial products based on visual communication is analyzed. In Chapter 4, industrial product graphic design based on the concept of visual communication is analyzed by associative analysis. Image based on Visual Communication Industrial graphic design is analyzed. Finally, industrial product graphic design based on the concept of visual communication is evaluated and analyzed. Chapter 5 is the conclusion.

2. State of the art

2.1. Discussion on the connotation of visual communication design

Visual communication design includes: font design, logo design, poster design, advertising design, printing design, corporate identity design, packaging design, brand promotion design, fashion design and so on [6]. In general, the design of visual communication is to transform ideas into images, to make effective use of image to convey the impression of others.

Visual communication design is defined as: a sense of beauty is captured through the words, symbols and modeling. Expressing images, ideas, and attempts are captured to achieve communication and persuasion effect. Communicating design is an intellectual, technical, and creative activity that is not only to create the image, but also must have the analysis, organization and presentation of visual solutions, to solve the problem of communication [7]. Therefore, the definition of visual commu-

nication design can be summarized as follows:

(a) Analysis, organizational visual elements (text, symbols and modeling) create a visual aesthetic solution.

(b) The information is communicated correctly and persuasively in order to achieve the effect of communication and persuasion [8].

Based on the design function of visual communication, abstract shapes, bodies, colors and ideas, or figurative things are imaged by design. Through various visual media such as posters, packaging, newspapers and magazines and books, ideas are clearly communicated to the aspirations of the object in mind [9].

Based on the principle of visual communication design, the general performance is to create more innovative forms or expression techniques to enrich the public's visual enjoyment, and to satisfy people's new psychological, such as unity and change, symmetry and balance, contrast and reconcile, proportion and scale, rhythm and prosodic [10].

Based on the application of visual communication design, visual communication design is the design of the transmission and communication of visual information. Its involved fields include: corporate identification another, commercial marketing, advertising design, environmental landscape and personal image and so on. Good visual communication design not only can promote the goods and promotional activities, but also can enhance the people's aesthetic and lifestyle [11].

2.2. Industrial product graphic design based on visual communication concept

With the change of design environment, industrial product graphic design or visual communication design appellations have a certain meaning, in the future design industry, a broader definition of the industry will appear, visual communication design contains more comprehensive information, covering all walks of life , so that the design can go deep into every field. Designer Haruya said that design is not a skill, but the ability to capture the essence of things and insight. Therefore, the designer's main task is not to design practice, but to maintain the sensitivity of the community. According to the changes of the times, resources in the design field are carried out a reasonable configuration [12].

The new approach of the development of industrial product graphic design is to make rational allocation of different media resources in order to promote the development of graphic design of industrial products [13]. The main development trend of graphic design based on visual communication is the evolution process of information integration and information transmission to the visual translator. Whether it is the traditional graphic design or modern visual communication based on the concept of visual communication design needs to rely on design functions to achieve. No matter how the new media technology develops, it will become the development space of the industrial product graphic design, it is the extension of the visual communication carrier, and it will also provide more possibilities for the graphic design reproduction to further enhance the social value of the graphic design [14]. The following is a visual communication design works related pictures (see Fig. 1).

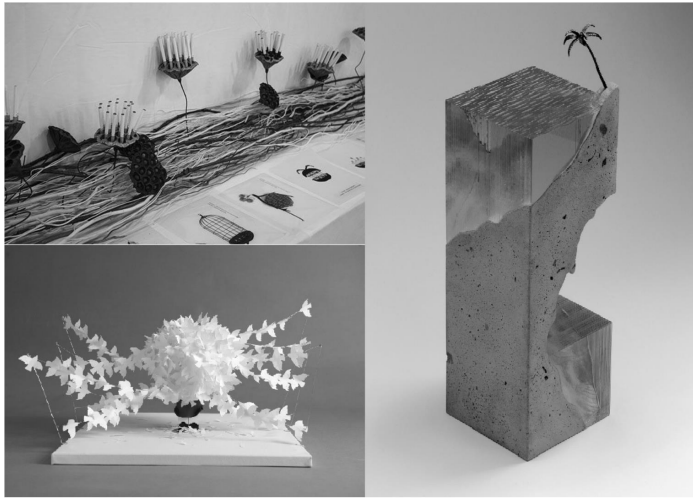


Fig. 1. Visual communication design works

3. Methodology

The design flow of industrial products based on the concept of visual communication is: firstly, the unification and change, symmetry and balance, contrast and harmony, proportion and scale, rhythm and rhythm and other related to visual communication design knowledge is stored in different knowledge base according to their different structure forms. The basic information base of industrial products was improved and the corresponding graphic design style was searched according to the industrial product type. Then the design style was combined with the concept of visual communication, and then the fine adjustment was made according to the characteristics of industrial products. Therefore, industrial product graphic design system structure based on visual communication concept is shown in Fig. 2.

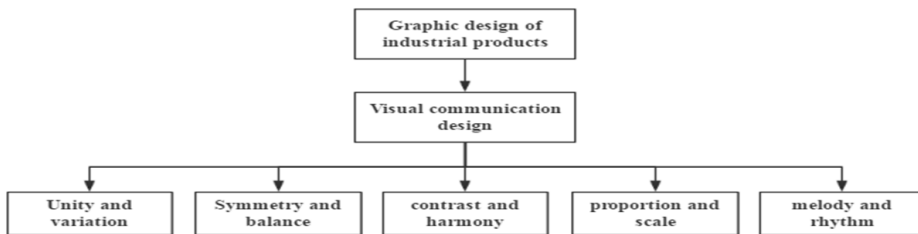


Fig. 2. Framework model of industrial product graphic design based on visual transmission

Graphic design of industrial products based on visual communication starts from the business requirements of industrial products. The elements and contents of the graphic design are determined. Therefore, the design sequence in the graphic

design of industrial products based on visual communication plays a certain role in the effect of the finished product. Graphic design of industrial products based on visual communication is divided into a number of design patterns. First of all, the results of color and association analysis of industrial product graphic design based on visual communication are sorted out. With the results of the analysis, each color and association have their corresponding flat transmission effects. According to the demand of the graphic design goals, image color and other sequences are designed and acquired, the corresponding design is generated, graphic design tasks are carried out.

In addition, this paper applies the method of fuzzy comprehensive evaluation to quantify and comprehensive evaluate the factors (uniform and change, symmetry and balance, contrast and harmony, proportion and scale, rhythm and rhythm) involved in industrial product graphic design based on visual communication concept, which helps the visual communication of industrial product graphic design to obtain accurate evaluation information. Here, a set can be used to represent and then perform a quantitative analysis: (r means the influencing factors of visual communication design, v means evaluation factors of visual communication design)

$$R = \begin{pmatrix} r_{11} & \cdots & r_{1n} \\ \vdots & \ddots & \vdots \\ r_{m1} & \cdots & r_{mn} \end{pmatrix}, \quad (1)$$

$$V = (v_1, v_2, v_3, \dots). \quad (2)$$

Graphical design of industrial products based on visual communication can be expressed by decomposition of logic function. Each decomposition is uniquely determined by a set of sub-functions. In this way, as long as the sub-function is known, the logical function can be determined. The sub functions and decomposition of logical functions are defined as follows: (x means the explanatory factors of visual communication design)

$$f_c = f(x_1, x_2, \dots, x_{i-1}, c, x_{i+1}, \dots, x_n). \quad (3)$$

4. Result analysis and discussion

4.1. Association analysis of industrial product graphic design based on visual communication concept

In the expression of visual communication design emotions, in addition to the instinct level and behavior level, there is a very important emotional element, that is, Lenovo, especially color association. Lenovo is the link of thinking people, but also the main way to transfer and think of human emotions. Positive and conscious association can promote people's thinking, to help people sublimate knowledge of things. In general, there are two main ways to use association in visual communication design. One is to allow viewers to imagine the specific physical, and the other

is to allow the viewer to imagine the abstract emotion or idea directly. Therefore, association reasoning and imagination are carried out in the visual communication design, the audience's habit of thinking and understanding of color and other factors should be fully taken into account and meet. In the visual communication industry graphic design, the things and abstract emotions that can be associated with a variety of colors are in Table 1.

Table 1. A variety of colors can be associated with things and abstract emotional classification

| Colour | Specific things | Abstract emotions |
|--------|-------------------------------|-----------------------------------|
| white | Facial tissues, bride, doctor | Nature, purity, peace |
| red | Apple, blood, sun, pepper | Warm, unrestrained, dazzling |
| Orange | Wu Zi, the flame, the sun | Dazzling, warm, vibrant |
| yellow | Oranges, tigers, bees | Sweet, warm, fresh |
| green | Grass, trees, forest | Nature, freshness, health, peace |
| blue | Sea, sky | Melancholy, steady, rational |
| black | Hair, black, eyes | Mystery, darkness, despair, death |
| purple | Grapes, Li Zi, purple roses | Mysterious, noble, dream |

From the table above, in the design of industrial products based on the concept of visual communication, the characteristics and functions of industrial products need to be fit, the appropriate lines and patterns are selected, which constitute a harmonious plane to stimulate the audience positive emotions and other positive associations, in addition, the color of the mix also has important significance.

4.2. Imagery analysis based on visual communication in industrial graphic design

Visual communication of industrial graphic design is required to achieve the communication effect that when the audience looks at the design work, the judgment, preferences and attitudes should be consistent with the original intention of the designers. One of the ultimate goals of visual communication is to make design works resonate in the hearts of people. The communication between the designer and the audience is realized, which gives the audience a sense of heart and emotional dependence. The three-dimensional color image is composed of hue, lightness and chroma three properties, and can be expressed by color solid. Therefore, in the visual communication of industrial graphic design, in the expression of color images and their feelings, cold and warm, strong and weak, likes and dislikes are the three elements of feelings, which constitute a three-dimensional color scheme for visual communication design. The results of the image survey are shown in Table 2.

Table 2. Three kinds of color image can be used in visual communication design

| Image type | Specific images |
|------------------|--|
| Evaluation image | beautiful - ugly, elegant - vulgar, favorite - disgusted, natural - tweaking, close - alienated, balanced - messy, clean - dirty, valuable - worthless |
| Active image | warm - cool, eye-catching - muddy alone, gorgeous - simple, lively - quiet, male - female, stable - restless, trendy - classical, active dial - steady, casual - formal, sweet - bitter, fresh - stale |
| Power image | hearty - tough, tough - soft, young - aged, brisk - thick, bright - dark, powerful - weak, nervous - relaxation, sharp - slow, romantic - rational, natural - artificial |

4.3. Fuzzy evaluation of industrial product graphic design based on visual communication concept

In this experiment, the industrial product designs of a number of enterprises in Guangdong Province are used as a research sample. Graphic design effects are divided into five levels. At this time, the fuzzy relation between the evaluation factor set and the evaluation set can be expressed by the evaluation matrix, the evaluation factor set = (unity and change, symmetry and balance, contrast and harmony, proportion and scale, rhythm and rhythm), the evaluation level set = (the ultimate expression of the theme of the industrial industry, the better expression of the theme of industrial products, part of the expression of the theme of industrial products, very little expression of the theme of industrial products, deviation from industrial products). The fuzzy evaluation form of industrial product graphic design based on visual communication concept is the contents of Table 3 and the statistical analysis of the expression of industrial products based on the concept of visual communication is shown in Fig. 3.

From the chart in Fig. 3, in the result of fuzzy evaluation of graphic design of industrial products based on the concept of visual communication, the proportion of ultimate expression of the industrial industry theme reached 50%. Especially in the evaluation of unity and change, symmetry and equilibrium, in the comparison and harmonization, proportion and scale evaluation, the ultimate expression of the theme of the industrial industry reached more than 30%. In general, in the graphic design of industrial products based on visual communication concept, 70% industrial enterprises in the ultimate express the industrial industry theme in the unity and change, theme of change, symmetry and balance. 80% above can express the design of industrial product theme. Only 10% of industrial products deviate from the industrial product design in proportion and scale, rhythm and rhythm. It can be seen that the design method based on visual communication can improve the unity and change, symmetry and balance, contrast and harmonization, proportion and scale, rhythm and rhythm of industrial product graphic design. In addition, the actual characteristics of industrial products need to be fit. Imagery and association are incorporated into the visual communication design, so as to design and improve the turnover of industrial products plan.

Table 3. Fuzzy evaluation of industrial product plane design based on visual communication concept

| Evaluation factors Unification and change | | Evaluation level | | | | |
|--|------|---|---|--|--|------------------------------------|
| | | Ultimate expression of the theme of the industrial industry | Better expression of the theme of industrial products | Part of the expression of the theme of industrial products | Very little expression of the theme of industrial products | Deviation from industrial products |
| Symmetry and equilibrium | 0.11 | 0.5 | 0.2 | 0.2 | 0.1 | 0 |
| Contrast and harmony | 0.13 | 0.5 | 0.2 | 0.1 | 0.2 | 0 |
| Scale and scale | 0.16 | 0.3 | 0.2 | 0.4 | 0.2 | 0 |
| Rhymes and rhythms | 0.18 | 0.4 | 0.3 | 0.2 | 0.1 | 0 |
| Evaluation factors | 0.20 | 0.4 | 0.3 | 0.1 | 0.2 | 0.1 |

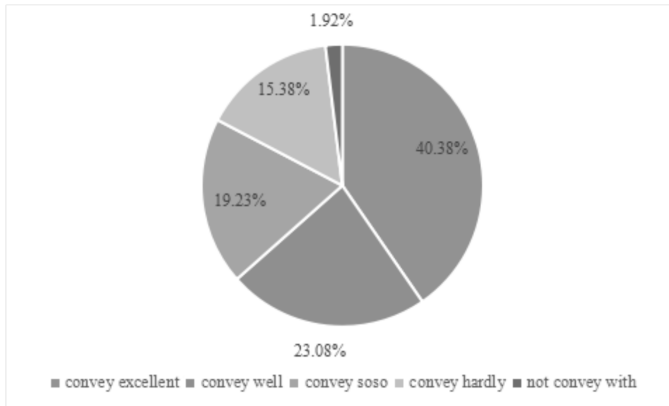


Fig. 3. Statistical analysis of the expression of industrial products based on the concept of visual communication

5. Conclusion

The characteristics of the era of productivity determines the characteristics of the design, modern multimedia technology is a kind of ubiquitous power. The emergence of digital multimedia challenges and enriches the traditional visual communication. Modern graphic design is extended. Visual communication transforms from plane and static of the shape to dynamic and comprehensive, from a single media to the

media, from the two-dimensional plane to three-dimensional and space, from the traditional printing design products to the communication of virtual information image. Based on the concept of visual communication design, design method based on visual communication concept is gradually widely used.

The research and analysis of industrial product plane design based on visual communication concept was completed in three steps. Firstly, the image and association in industrial product graphic design based on visual communication were analyzed. The design was carried out according to different industrial product characteristics and audience psychology. Finally, the industrial enterprises in Guangdong Province were used as samples. The graphic design of industrial products based on visual communication was evaluated in a fuzzy way. The results show that the design based on the concept of visual communication can improve unity and change, symmetry and balance, contrast and harmony, proportion and scale, rhythm and rhythm of elements in industrial plane. In addition, imagery and audience association needs to be considered in visual communication.

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