COLOR IN INDUSTRIAL DESIGN

Daria PROSCURINA[1], Daria HARITONOVA[1]

[1]*Department of Industrial design, DI-211, Faculty of Design, Technical University of Moldova, Chisinau, Moldova*

Coordonator: Lilia BURDILA, university assistant, Department of Foreign Languages, TUM

Abstract. *This article examines the concept of color, its perception and role in industrial design. The choice of color is of particular importance for the designer, since it can affect a person: cause emotions, influence the perception of any objects and create illusions.*

Keywords*: color, industrial design, color theory, characteristics of color, emotions*

Introduction

Everything around us has one color or another. As a rule, we see many different colors or colored objects: the sky, fields, mountains, cars, buildings, and so on. Color is very important for identifying objects: determining its position in space and re-identification of them. Our perception of physical things is so strongly connected with the identification of objects by their appearance, and colors are important for this. Psychological aspects, context and culture also play a significant role here. Psychological research data suggests that for a person, each color has certain properties and gives a certain association.

When color is used in design, the following concepts appear: color theory and color trends.

Color theory

Color (French. couleur, German. farbe) is the property of material objects to emit and reflect light waves of a certain part of the spectrum. In a broad sense, color means a complex set of gradations, interactions, variability of tones and shades. The appearance of a person's color sensation is influenced by visual experience and memory, physiological and psychological characteristics [1].

The study of color consists of two main sections: chromatology and coloristics. Chromatology examines color from the perspective of data from various scientific fields: chemistry, mathematics, physiology, physics, aesthetics, psychology. Coloristics also explores the main characteristics of color, the harmonization of mixing, methods of its organization, as well as the effects of color on spatial shaping.

The main qualitative and quantitative properties of color are: hue, saturation and luminance.

Hue is one of the main properties that determines the shade of a chromatic color, according to which one color differs from any other: green from red [1].

Saturation (colorfulness) is the degree of saturation, intensity of a certain tone, that is, the difference between a chromatic color and an achromatic color equal in brightness. Gray tones are called achromatic (colorless) and are considered to have no saturation and differ only in lightness [1].

Luminance is the quality of a color by which it can be compared with one of the colors of the achromatic series [1].

A color wheel is a circular model of the color spectrum. It is the main tool for combining colors, creating various schemes of its combinations. Currently, there are many color circles of various purposes and complexity. Below we will analyze the three main color circles.

Isaac Newton was the first to study the spectrum of sunlight. In 1667, he systematized the seven primary colors in the form of a circular model (Fig. 1).

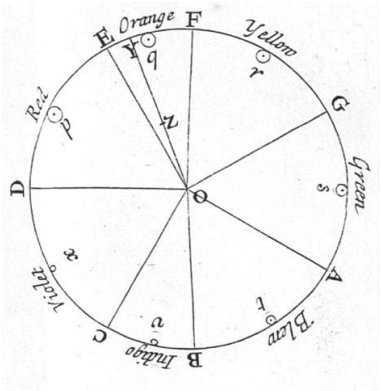

Figure 1. Newton's asymmetric color wheel [1]

Later, 140 years later, Goethe perfected Newton's circle and made his own color circle (Fig. 2). He added a purplish color to the circle, which was obtained by mixing red and violet.

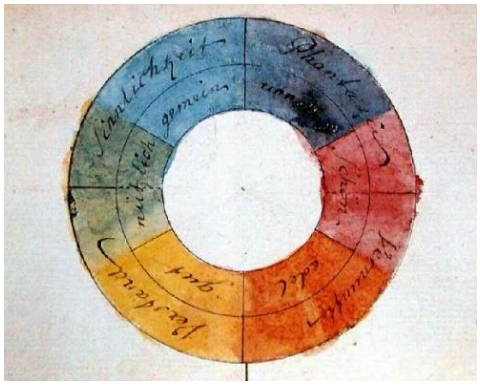

Figure 2. Goethe's symmetric color wheel [1]

He also thought about the influence of color on the human mind, discovered the phenomenon of "sensual and moral action of color" in the scientific work "Theory of Colours".

Today, in all spheres of art: painting, architecture, design and others, the Itten's color wheel is used (Fig.3). It is a circular scheme of twelve colors. This is the most successful and widespread system of arrangement of colors and their interaction.

Figure 3. Itten's color wheel [1]

In the center of the Itten's circle there are three colors: red, blue, yellow, which are considered primary. All the shades that we see are the result of a combination of primary colors.

When two primary colors are mixed, secondary colors are obtained: orange, purple and green.

If you mix the primary and secondary colors that are next to each other on the circle, you will get a tertiary color. There are only six of them: blue-green, blue-purple, red-purple, red-orange, yellow-orange and yellow-green.

Trends

Pantone is a universally recognized world authority and standard in the field of color. This is a specific color created using a mixture of several colors and having its own number according to the Pantone Matching System (PMS) classification.

The institute at the company is a research unit that analyzes color trends and predicts them. Experts there rely on data from a wide variety of cultural fields, monitor public life, and use knowledge on the psychology of color.

The color of the year is intended for use in design in various fields. According to a study by Color Marketing Group, a well-chosen color with a probability of 80% increases brand confidence and helps to build relationships with customers.

In 2023, Viva Magenta was chosen as the main color - a crimson-red shade with a purple undertone.

On its website, Pantone, in collaboration with some brands, shows how the color of the year can be used in marketing (Fig.4) [2].

Figure 4. Color of the year in marketing [2]

Color in industrial design

The role of color in the life and activities of each individual and society as a whole is exceptionally great: in industry, transport, art, modern technology of information transmission, etc.

Color is the most active means of harmonizing the form and space of individual products, their sets, complexes and the subject environment as a whole [3, 6].

For a designer, color is a powerful tool, because with its help it can affect the physiological processes and the state of a person. Color can change a person's mood, give him a feeling of cheerfulness or oppression, joy or sadness, can enhance the feeling of heaviness, visually change the proportions and dimensions of space and objects, affect the feeling of warmth and cold, etc. Therefore, understanding what color really is, the psychology of its perception and the mechanisms of influence on the color receptors of our eye is very important for its proper application in practice.

Being one of the most important components of any composition, color can visually reduce and shorten, lengthen and enlarge the image, create a sense of balance and imbalance. The color scheme must be carefully thought out from the position of maximum compliance with the created image. Usually the principle of color selection is harmony. In order to use color correctly when creating a composition, it is necessary to know its spatial and emotional properties.

Spatial properties of some colors:

1. The red color is perceived as very close, protruding; increasing the volume in width, heavy, hot, bright, active, dynamic [3, 6].

2. Orange color — close, protruding; enlarging and, as it were, playing with volume; light, warm, blinding, sparkling, dynamic, mobile [3, 6].

3. Yellow color — approaching, protruding; slightly increasing volume; bright, radiant, flowing, mobile, but ephemeral [3, 6].

4. Green color - fresh, clear, soothing [3, 6].

5. Blue color — receding, retreating; airy cool [3, 6].

6. Blue color — distant, retreating; reducing the volume in width; heavy; very cold, dark, frozen, motionless [3, 6].

7. Purple color — distant, retreating; reducing the volume, making it more elegant; Lilac is perceived as light, and purple is very dark; lilac — as calm, purple — as frozen; lilac — as sad, purple — as tiring, depressing and even frightening [3, 6].

8. White color — perceived as approaching, increasing volume; light, cool, very light, passive, calm [3, 6].

In the world of design, material and emotional values must be combined with each other to create objects that resonate with customers.

When creating their projects, designers think about the following aspects:

Consumer perception. Buyers compare the product with similar options in the industry. First of all, consumers will appreciate the quality, design, size, color and creativity.

The desired perception. To create an impression of value and quality, you should think through every nuance, from the material to the color. The right elements and how they will be combined to achieve an effect can be the difference between a bestseller and an ordinary product.

For example, the G-shock brand wristwatches (Fig.5) are indeed known for their durability and reliability.

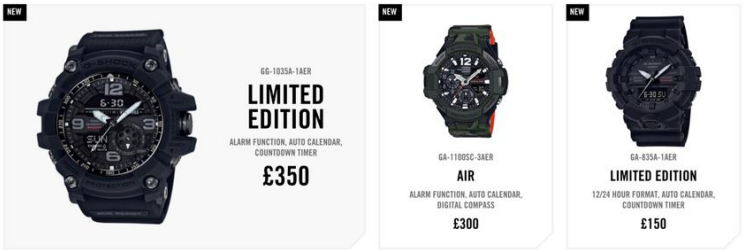

Figure 4. G-shock watch [4]

When creating this object, black color was used, which in our perception is associated with authority, power, stability, intelligence and strength. Because of its timeless elegance, this color is very common in the communication of fashion brands.

Understanding the role of color in packaging and labeling can be the next step in connecting with consumers and increasing profits.

When creating a subject environment, color is one of the main factors of household comfort. The choice and use of a particular color of the product significantly affects not only its composition and aesthetic properties, but also the comfort of human work in the production environment: increases his mood, reduces fatigue and the possibility of injury during maintenance or management of technological equipment [5].

In order for the work to be productive and efficient, and for employees to feel comfortable in the workplace, it is important to choose the right predominant color in the office.

For example, the tones of the white spectrum are harmonious in small rooms with a lack of natural light (Fig. 6). They contribute to improving performance, increase the speed of work, tone up and set you up for optimism.

Figure 6. Application of color in the organization of the subject environment of the office [6]

Conclusions

Thus, color selection is a difficult and responsible task, because color has great functionality.

In design, color is a very important and integral part. This is the force that drives sales of almost any consumer product. A study conducted by CCICOLOR - Institute for Color Research found that people make a conclusion about a person, an object within 90 seconds or less. 90% of this decision is based only on color, so the choice of color should be approached wisely.

Knowing the features and characteristics of color, the designer can create a harmonious spatial environment, form a certain image, and also influence people: cause certain emotions, associations. The color will help to position the subject, stimulate some action.

This is very important, because it is precisely these goals that the design itself pursues - attracting attention to the created object.

Bibliography

1. Natalia, PANOVA *Color Theory* [online] 07.03.2017 [accessed: 10.03.2023] Available: https://postnauka.ru/faq/73352
2. Pantone[online] [accessed: 3.03.2023] Available: www.pantone.com/marketplace
3. MEDVEDEV, V. Yu. *Color science and coloristics: a textbook.* — St. Petersburg: CPI SPGUTD, 2005.
4. G-SHOCK [online] [Accessed: 5.03.23] Available: https://www.casio-europe.com/ru/products/watches/g-shock/
5. Color in Industrial Design [online] [accessed: 3.03.2023] https://studfile.net/preview/5153039/page:8/
6. Interiors of white furniture [online] [Accessed 5.03.23] https://ofc.com.ua/katalog/mebel-v-belom-tsvete