

Research on Emotional Factors and Emotional Experience of Information Graphic Design in Visual Communication Design

Wenyan Zhao, M.Sc

Wenyan Zhao, Lecturer, School of Art and Design, Jingdezhen Ceramic University, Jingdezhen 333403, China.

Correspondence Lec Zhao; dhbvk532475@163.com

Objectives: With the development of the Internet and the change of the mode of communication, information is disseminated on a large scale in a very short time. Everyone is surrounded by information. Whoever has the information will have the first chance. **Methods:** Interactive information visualization design provides more space for independent thinking while conveying information and emotion to users. The public has more strict requirements on visual communication design. Only graphic design incorporating emotional factors can gain public recognition and bring visual impact and spiritual enjoyment to the audience. **Results:** As the most common and common way of transmitting information, visual communication conveys and transmits information in a form that people can visually recognize. As more cutting-edge design concepts spread within the design circle, many designers are beginning to learn and understand information visualization design. **Conclusion:** This article will explore the emotional factors and emotional experiences of graphical graphic design in visual communication design through rich and specific information visualization methods.

Key words: design; visual communication; emotional factors; graphical

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Visual communication and visual culture make images play an increasingly important role. Image narration can surmount the obstacles of language and writing, and it is easier to attract people's attention and influence¹. Science and technology have made major breakthroughs in a few short years. The emergence of the Internet has provided a tool for global communication at extremely low cost. Subsequently, the emergence of the World Wide Web has enabled everyone to transmit their digital information to the Internet². When users acquire the information they need to master, they often treat it through different channels, different means and even different ways of thinking, which is the result of different understanding. Visual communication design requires designers to have imagination, but this imagination needs to be based on the accumulation of life. A large number of perceptual materials are collected and expressed in memory. The more perceptual materials they master, the more unconstrained their creativity

will be³. The advent of the information age has brought about tremendous changes in the way information is disseminated, and it also gives a broad space for the development of web interface design⁴. The information society characterized by computers and networks has changed people's way of life, and the digital way of living has brought people into an unprecedented state of existence⁵. As the most common and common way of information transmission, visual communication conveys and transmits information in a form that people can visually recognize. It enables people to understand the world and carry out creative activities, and also enables people to communicate and communicate with each other across language barriers.

Since visual communication design is closely related to marketing, planning, and advertising, some design majors in China now require students to supplement marketing, advertising, and other related courses to enable students to

have more skills ⁶. More and more information design is spread in the network. The network is used to display information graphically. Information graphics has a new state, and more and more dynamic or interactive information graphics appear. More and more people are beginning to get into information visualization design, and under the influence of visualization technology, life becomes more and more simple and beautiful ⁷. A good designer can often integrate things that are not too relevant in life and design a visual communication with rich creativity and logic. Let the audience have a strong sense of excitement and early taste, and then strongly impact their thoughts and enhance their impressions and memories ⁸. As more cutting-edge design concepts spread within the design circle, many designers are beginning to learn and understand information visualization design ⁹. The graphic design of information studied in this paper is a visual design that integrates the essence of design psychology and cognitive psychology through the expression of basic visual elements, and presents all kinds of information as acceptable to the general public. In this way, information can be accurately and efficiently transmitted.

Nowadays, people's emotional needs are increasing in the expression of architectural design, but architectural forms are diverse, and people's habits and emotions are also different. The emotional language in architecture is relatively auxiliary, and designers should organically integrate color space and emotional space ¹⁰. The birth of network information dissemination integrates the advantages of newspapers, radio and television. It has not only the timeliness and storability of newspapers, but also the image and vividness of radio and television. All social activities of human beings can be labeled with emotion, which covers social background, social customs, social culture and other aspects, as well as the cognition and psychological reaction of individual to things ¹¹⁻¹². Network information dissemination has really broken through the time and space restrictions, weakened the differences between disseminators and audiences, and caused substantial changes in the field of human communication ¹³. The demand for information design in modern society is extremely urgent, and whoever has the information will have the first chance, especially in the future ¹⁴. After the information visualization design begins to have a high degree of acceptance, the next thing that needs to be

explored and researched is how to make the information more complete and coherent through information visualization, and at the same time vivid and fun ¹⁵. This article will explore the emotional factors and emotional experiences of graphical graphic design in visual communication design through rich and specific information visualization methods.

In the early stage of the development of information visualization, it is only part of scientific research, but with the development of new media technology, people's life and information are increasingly close, and visualization technology is also emerging. Bonoti F published a theory on data graphics that emphasizes the maximization of useful information density ¹⁶. Graphic designer Russo M et al.'s "Empirical evidence for discrete neurocognitive subgroups in bipolar disorder: clinical implication" combines practicality and art. Through a large amount of information visualization works, it tells the success of design masters ¹⁷. Stewart J L's "Resting and task-elicited prefrontal EEG alpha asymmetry in depression: Support for the capability model" mentions that people are increasingly inclined to pursue the freedom to define their identity, spirit, and lifestyle ¹⁸. Mattay V S pointed out that when designers carry out visual communication, most of the time they focus on the aesthetic feeling of vision, ignoring the user's participation experience and emotional characteristics of information communication, and failing to design information and related disciplines ¹⁹. Dunlop S M studied chart design very thoroughly by combining the expression of traditional charts and new charts, and many students also took this as a research topic for analysis and research ²⁰. As the workers and educators of visual communication design, it is an inevitable choice to carry out practical attempts and reflective discussions on visual communication design in order to realize the design realm of extension, cross-border, interaction and experience under the globalization.

METHODS

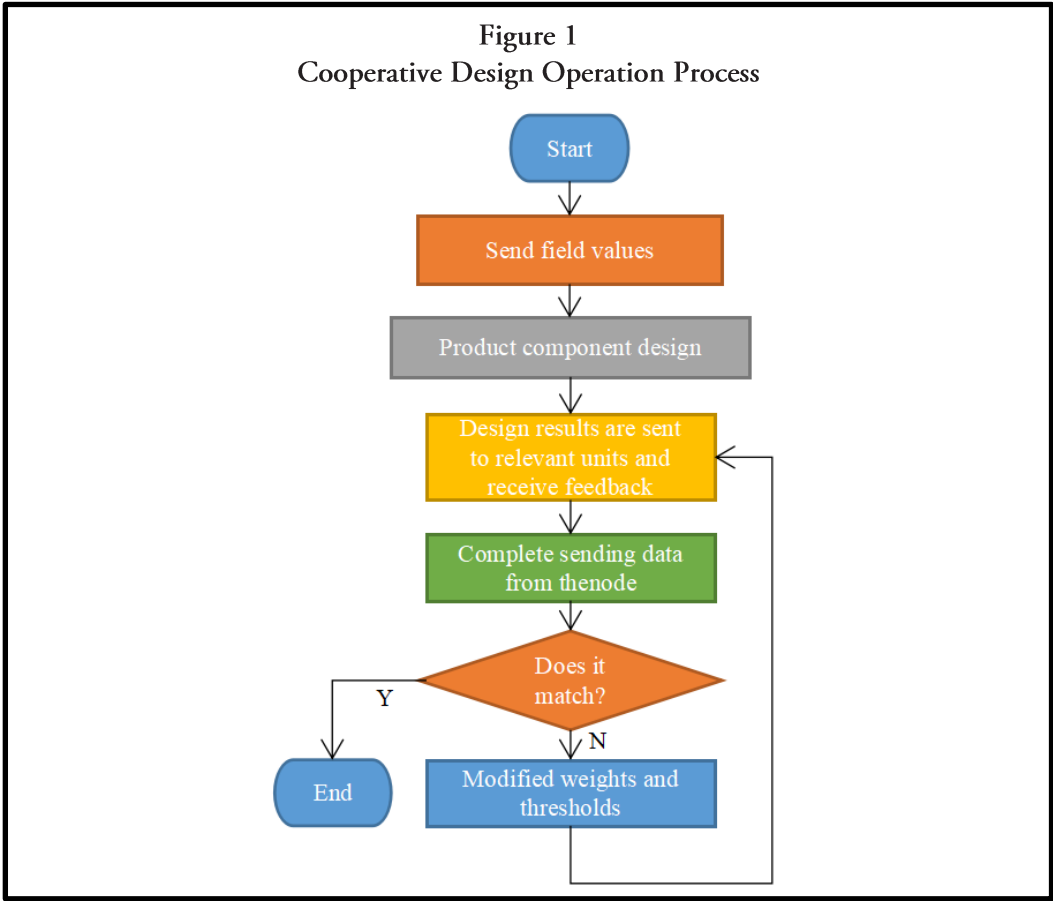
Application Scope of Visual Communication Design

Information design is an interdisciplinary subject. The definition and appellation of information design are not consistent in the world, and its definition and research focus are

also different in different disciplines. Design must meet people's material and spiritual needs. Under different social conditions, material and spiritual needs account for different proportions in design. With the progress of science and technology and the improvement of people's living standard, the way of transmitting information through pictures is no longer sufficient to express all the information, and more information visualization means have emerged. Human emotion is an instinctive response of the brain and plays an important role in people's life. It can quickly distinguish good from bad, safety from danger. Humanization of visual communication design will be the inevitable trend and final destination of future design. Designers should pay more attention to human emotion and the integration of human and environment ²¹. From the generation of the interface to the emergence of the

Internet, web interface design has a set of mature theoretical and practical experience in Western countries, and has proposed many basic design principles unique in web interface design.

Visual communication design works will show different styles due to the difference in color, text and other factors. Visual communication design can only withstand the test of the audience by emphasizing the integration of emotion and emotion. The emotion is the essence of visual communication design. A software platform based on information graphical design focuses on the parameters and rules that affect the design. Use existing technology to create a multi-modal collaborative work environment. A collaborative work support platform with an integrated and integrated multimedia model. The cooperative design operation process is shown in Figure 1.



Information design originates from graphic design and is initially taken as a part of graphic design curriculum research. With the development of computer technology and information technology, information design has become a separate professional term. In social life, people often have their own

emotional experience and perception, and always hope to express their emotions with the help of some foreign objects such as expressions, words, languages, etc. People pay more attention to emotional factors in the appreciation of design works, and the interaction between works and audience's

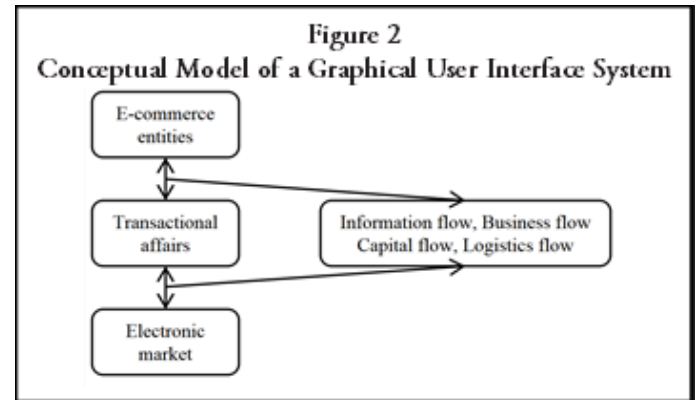
emotions can often arouse people's consumption consciousness²². This is because they resonate with the design works, and have received psychological respect and spiritual satisfaction. Consumers' needs are not only confined to goods or services that can satisfy their own use functions, but also pay more attention to obtaining more pleasure and satisfaction at the psychological and spiritual levels when using products, i.e. more and more attention is paid to the needs at the visual aesthetic level²³. Information design has a very wide influence in various fields. People do not realize the application of information design in life. Most families have one or two maps of the world or cities. No matter in which era of human progress, information graphics are closely integrated with human life forms and lifestyles, and are ubiquitous in all areas of human civilization.

Design Theory of Emotional Integration

With the spread of information visualization concepts on a global scale, the research on information graphics has only turned to the research of interactive information visualization design. "User-centered" has become the theme of the information age. In order to expand the market, the company deliberately expresses its unique quality and personality information through external visual images such as products and sales points, and transmits it to the consumers. Information design is the most challenging area in graphic design, because information design requires designers to perform perfect design and systematic logical thinking, making design attractive and functional. People's emotional expressions are different in different classes, different occupations and ages. Designers often express emotions through their own works. The big reason is that they pay attention to something in life and accumulate. When various information is converted or partially converted into graphics, its design, performance, and literacy will be greatly improved, and information can be transmitted more effectively.

After the emergence of simple infographics, people began to have a modular understanding of the concept of information. But this kind of understanding is superficial after all. After all, not all information is applied to the chart. The

development of software projects is a complex and mutually assisted process, and many unexpected problems arise during the entire project development process. Often solving these problems will cost developers too much time. Figure 2 is a conceptual model of a graphical user interface system.



RESULTS

Information Graphical Emotional Communication

The embodiment of emotional concept in visual communication is multi-faceted, both sensible and rational. There are direct perceptions that can cause changes in the viewer's inner feelings, as well as rational thinking that can stimulate the audience's deep reflection on the meaning of society. People can't say what they are attaching to something, and they don't even know why they have feelings about something, which is related to their long-term life experience. Information design is not only a simple translation of visible data, but a relationship between filtering information and establishing information. Interactive information visualization design is now being applied in more and more fields as a new way of conveying information, which presents a new world view and values to the audience. Visual communication design works not only have emotional imagination, but also visual language. The transition from life to design is a creative process. The style of visual communication design works should be positioned in terms of life materials, work functions and the emotional tone of the designer. In today's highly developed logical thinking and computer synergy, the graphicalization of information has developed into a more advanced scientific and

technological method and tool, with the language factors of logical relationship reasoning, induction and communication.

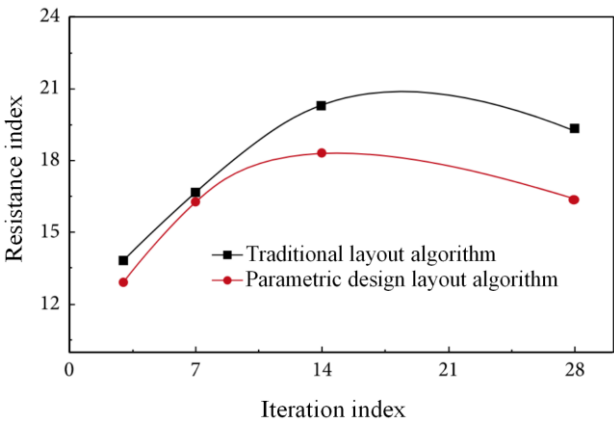
The page design model created by the work task based on information graphic design can advance the design problems and quality

problems that may occur in the project in the form of collision detection. The performance optimization parameters before and after optimization are shown in Table 1. The topology reliability optimization simulation is compared as shown in Figure 3.

Table 1
Performance Parameters of Topology Optimization Topology Before and After Optimization

	Before optimization	After optimization
The number of rows	33	39
Number of columns	11	19
Monitoring points	363	741

Figure 3
Graphic Layout Optimization Simulation Comparison



In order to determine the circumstances under which the exclusion operation and the attraction operation are performed, a diversity control method is introduced.

$$L_{\lambda} = M_L \cdot Q_{cal} + A_L \tag{1}$$

The iterative suspension condition is generally selected as the maximum number of iterations or the optimal position searched by the particle swarm to meet the predetermined minimum adaptation threshold. Change the position and velocity of each particle according to the following formula:

$$\theta(P) = Ln(\frac{P}{1-P}) = \alpha + \sum \beta_i X_i + \xi \tag{2}$$

Most information seekers, including those who are extremely rigorous, will take the easiest way to obtain more readily available information, regardless of the accuracy of the

information. In order to ensure that the visual communication design can promote learners' learning, the basic principles of design in visual communication design must be followed. Then the sum of the page parameters is defined as follows:

$$Cost(P_i) = \sum_{e \in P_i} C(e) \tag{3}$$

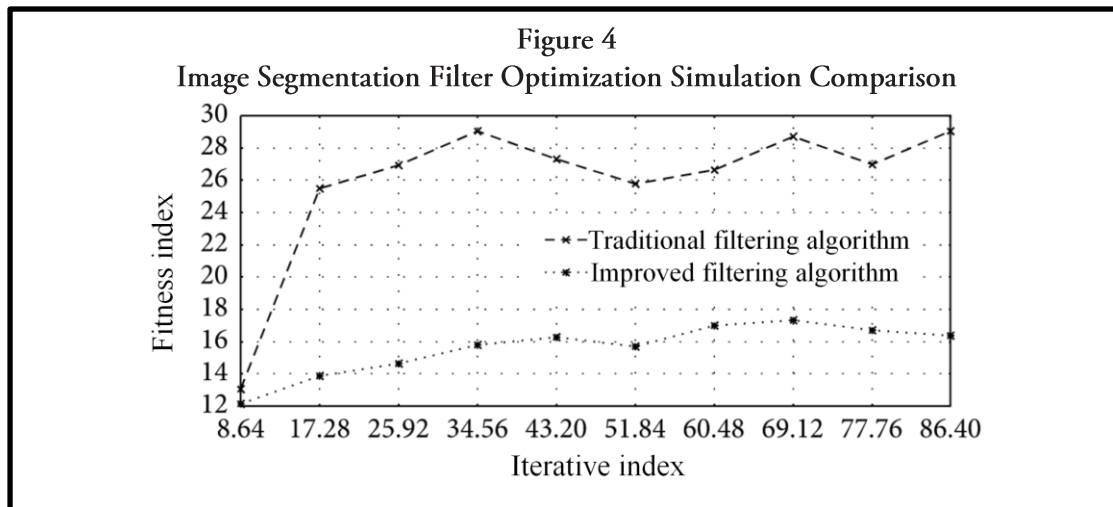
The above equation is still a continuous step function, so it optimizes one of its upper bounds, the exponential loss function. as follows:

$$p_{\lambda} = (M_p \cdot Q_{cal} + A_p) / \sin(\theta_{SE}) \tag{4}$$

For some images, some parts of the target object are beyond the boundaries of the image. No matter how the initial curve is placed, it cannot meet the requirements of surrounding the target object or being inside or outside the target object. After wavelet variation and filtering optimization, the image segmentation topology

is greatly optimized, with fewer nodes and better monitoring area. The image

segmentation topology reliability optimization simulation is shown in Figure 4.



The emotional concept and visual communication design are not simply used each other, but the deep meaning of emotion is comprehended in the design process. Visual design brings people enjoyment and feeling of beauty, which is the important purpose of its design. The design works should not only reach the intention expressed by users, but also meet the aesthetic needs. Information design adds visibility and readability to the data, making complex data simple, so that we can better understand and use these data²⁴. It is not an overnight skill to impress the audience through the emotion expressed in the design works, nor can it be achieved through simple form imitation. When the design works and the emotional tone are unified, the emotion can be expressed through special visual symbols, thus creating emotional connection between the audience and the works. Graphical communication form is the most intuitive and simple, unique, and easy to be accepted by the other party. It can vividly reproduce the intricate abstract concepts in people's minds and directly and clearly reflect the relationship between them. Text is also an indispensable element in visual communication design. With the description and explanation of the design works by text, the audience's emotion is more easily driven.

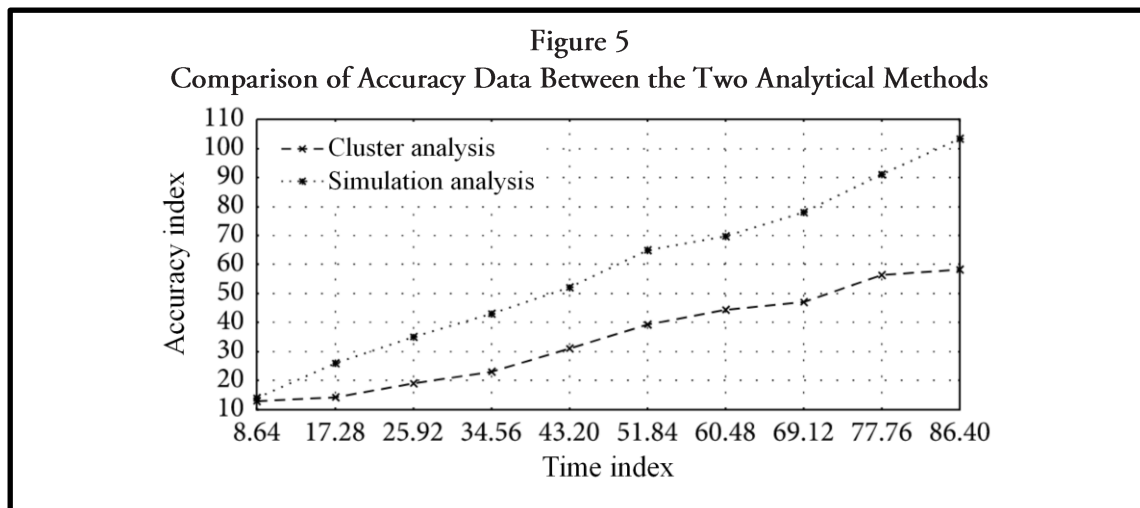
Information Graphical Emotional Communication Levels

For design works, in addition to scientific analysis, we need more moving emotional force to impress the general public.

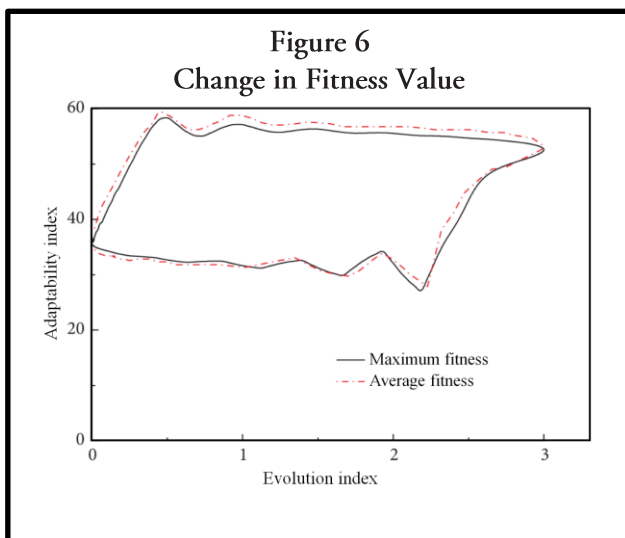
Information architects mainly focus on the construction of information structure behind the website. In large-scale website design, information interaction designers as a new profession are increasingly favored by design companies and network companies. If the presentation of information makes users feel certain difficulty or need to spend time and energy to analyze, it will inevitably make users feel a sense of frustration and spiritual depression, thus reducing the ability of users to accept information. Information graphics is actually the source of human information transmission. This concept has long appeared in people's life and work. In the course of the development and progress of human society and civilization, people's needs can not be met by means of information transmission. In the creation of works, the role of words is different from that of graphics and colors in works. The emotional words can make the expression of works more fluent and natural. Like art, design needs emotions. The only difference is that modern art may pursue more personal emotions and express the artist's personal thinking and understanding of life, society or something by using some form of expression.

Taking the statistical results of large data of index parameters of page evaluation as the research object, data clustering and information fusion are processed to realize the evaluation of design capability. The analysis shows that the accuracy of design capability evaluation by this method is higher and the utilization rate of design resources is better. The comparison of the

two methods is shown in Figure 5.



Engage users in interactive color matching and evolve through operations. The output schemes have good satisfaction and consensus, and the evolution process is terminated. The maximum fitness value may decrease during the evolution process, but the average fitness is increasing, with better global convergence and faster overall convergence. The fitness value curve is shown in Figure 6.



When performing 3D modeling, the flat curve, the vertical curve, and the combination of the two are easily determined and adjusted. The basic equation for the quadratic parabolic vertical curve is:

$$D(\mathbf{V}_t, \mathbf{V}_t') = \sqrt{\sum_{i=1}^c \left(\frac{V_{ti} - V_{ti}'}{|V_{ti}| + |V_{ti}'|} \right)^2} \quad (5)$$

The length of the vertical curve or the radius of the vertical curve is:

$$\log \Gamma(x) = -\gamma x - \log(x) + \sum_{k=1}^{\infty} \left[\frac{x}{k} - \log\left(1 + \frac{x}{k}\right) \right] \quad (6)$$

For points in a two-dimensional plane, with the coordinate values, you can calculate the corresponding and slope. With these three functions, you can draw a vertical line of the curve at that point. As follows:

$$K_{s,d} = \frac{1}{MN} \sum_{m=1}^M \sum_{n=1}^N \frac{\|W_{s,d}(m,n) - \mu_{s,d}\|^4}{\sigma_{s,d}^4} \quad (7)$$

Unlike interface designers, who focus on the balance of perception, layout and visual effects, information construction is based on user experience and pays more attention to the layout of the interface. The psychological effects of color on people will also vary depending on the age and psychological characteristics of the objects. Therefore, visual communication designers need to choose different colors and match colors according to the aesthetic preferences and psychological characteristics of different objects. Warm colors easily become the visual focus in a short time, attracting users quickly. However, because warm colors can speed up people's perception of time, they are prone to visual fatigue and irritability. Therefore, it is necessary to avoid long-term and large-scale use of warm colors in the color matching design of pages. The design defects of the page were investigated, and the results are shown in Table 2.

Table 2
Design Flaw Investigation Results of the Page

Defect type	Frequency	Proportion (%)
Interface	26	28.9
Color	17	18.9
Format	21	23.3
Content	10	11.1
Other	16	17.8

Take the page as its optimized object, not the sum of the conversion errors. The distance of a string pair in a color model is defined as:

$$O_t = f \left(\sum_i T_{li} - \theta_l \right) \quad (8)$$

When designing a page, you must follow the basic principles of design in visual communication design. Then the sum of the page parameters is defined as follows:

$$Cost(P_i) = \sum_{e \in P_i} C(e) \quad (9)$$

The above equation is still a continuous step function, so it optimizes one of its upper bounds, the exponential loss function. as follows:

$$f = \frac{\alpha P}{\pi d^2} \frac{ch \left(\alpha \cdot \frac{L_a - x}{d} \right)}{sh \left(\alpha \cdot \frac{L_a}{d} \right)} - \frac{4R_f}{\pi d} \cdot x \quad (10)$$

Take the page as its optimized object, not the sum of the conversion errors. The distance of a string pair in a color model is defined as:

$$Dr(p) = \frac{D(p)}{\min(P_A, P_B)} \quad (11)$$

From the perspective of cognitive psychology, following the user-centered design principle is essentially the embodiment of the people-oriented design concept, which is a way to more effectively convey information and enhance user experience and feelings. Emotional design of visual communication design works is difficult to leave the dependence of visual symbols, which are effective means for designers to express emotions²⁵. Text is the main carrier of information transmission and communication, and its appearance is inseparable from development and graphical thinking. The use of words can be seen everywhere in today's

visual communication design. In different time and situations, the different states of the same text can give viewers different emotional experiences. Another characteristic of the sense is that the sound from the front is easy to distinguish. The sound from the front right in the front sound is sensitive, because the sensitivity of the left and right body is different. Information design conveys large and complex raw data in a clear and intuitive way, helping the audience understand and accept information and solve problems.

DISCUSSION

At a time of rapid technological advancement, the richness and diversity of human life have led to a stronger expression of the need for spiritual and emotional world desires while satisfying material needs. Although the main purpose of information graphic design is to convey information, in the context of the growing society, society has put forward higher requirements for the development of information graphics. Visualization, as a means of expressing information, is a step in which the information required by the user is presented in the most intuitive form. The data can be visualized to convey information to the audience most conveniently. Visual communication design, which is close to the audience's daily life, not only has a special way of expression, but also can lead people to explore the beauty of social life and make people experience life deeply. The principles and methods that can be used for reference from the perspective of communication science provide infinite possibilities for the future development of visual communication design. In addition to static information graphics, dynamic information graphics and interactive design and experience design provide better ways and channels for designers to convey design emotions. Visual communication

designers should understand people's spiritual and emotional needs of works, and realize the emotional design of works.

Human Subjects Approval Statement

This paper did not include human subjects.

Conflict of Interest Disclosure Statement

None declared.

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