The Dynamic Effect of Visual Communication in Web Design and its Technical Realization

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Abstract. In the field of design, web design is a brand-new discipline that integrates the Internet and design and covers perception design, interaction design, information design and visual information communication design. Webpage information is communicated through the brand-new form of hypermedia, contains information such as sound, videos, pictures and texts, and provides users with large autonomy. In view of this, the article gives a brief overview of web design, conducts research on the issues affecting information communication in web design, further puts forward some suggestions for upgrading the effective communication of web design information, and mainly aims to provide valuable reference for the study on the effective communication of visual information in web design.

Keywords: Visual Communication, Web Design, Visual information, Interaction design.
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1 INTRODUCTION

Web design is a newly emerging inter-discipline in the design field that combines design and the Internet, inherits the traditional design concepts, and holds its own unique features. As an information carrier, webpages bring great convenience to people's access to information. Information dissemination on the Internet is featured with a high efficiency and a fast speed, thereby becoming an important channel for people to obtain information in their daily lives, relevant results proposed by Wang et al. [1-3]. Under the background of the increasing number of Internet users in China, the purpose of people using the Internet has been gradually diversified [4-6]. For this reason, this article studies the application of visual information communication in web design, which, undoubtedly, is of vital significance to elevating the efficiency of visual information communication on webpages and enhancing the user experience of network users.

Ishihara et al. introduced that excellent web design works are a good combination of art and digital technology, giving full play to the role of various visual design elements [7,8]. In these mature web design theories, many basic principles of design in web page design are proposed by Liu et al. [9-11]. For example, the traditional art design theory is taken as the theoretical basis of

web page design, and it should be followed in the design. The principle of simplification, consistency, balance, and unity, and also analyzes the relationship between various visual elements in web design research. Visualization of professional web design and development tools, web design is no longer just a professional computer Skills that people can control. More and more network enthusiasts and design enthusiasts have stepped into this new field of art design, relevant results proposed by Jaenichen et al. [12,13], especially the involvement of professional art designers, making web design a new profession and making web design Words such as personal homepages are deeply rooted in the hearts of the people. However, regarding the introduction and analysis of the pattern, color, static and dynamic image of web design, there is very little systematic theory about the relationship between visual elements and visual communication design. Therefore, seeing more on the webpage may be a layout with a uniform layout, a confusing color scheme, a confusing layout, and a hollow design with a hollow surface. To solve this problem and improve the overall level of web design, designers need to pay attention to web design, understand the connotation and characteristics of web design, and use this as a basis for creative work.

In summary, Webpage information is communicated through the brand-new form of hypermedia, contains information such as sound, videos, pictures and texts, and provides users with large autonomy. In view of this, the article gives a brief overview of web design, conducts research on the issues affecting information communication in web design, further puts forward some suggestions for upgrading the effective communication of web design information. From the perspective of an art designer, it analyzes the problems faced by the application of graphic visual elements in web design at this stage and its new development direction. At the same time, it analyzes the shortcomings of the professional website in the use of visual elements. The rest of this paper is organized as follows. Section 2 discusses Visual Communication and Web Design, followed by Visual Elements in Web Design in Section 3, and Section 4 concludes the paper with summary and future research directions.

2 VISUAL COMMUNICATION AND WEB DESIGN

2.1 Visual Communication

Visual communication refers to the sending and receiving of external information through visual symbols, which, essentially, is the communication of visual information. According to the definition, visual symbols and communication are two core concepts. Specifically, visual symbols refer to the applied information media that replace or represent a specific object and also the symbols recognized by the visual system. Visual symbols are tools for implementing information storage and memory and also the physical means that expresses thoughts and emotions [14]. For example, colors can be used as visual symbols to convey certain information. Red represents happy; green indicates hope; purple implies romance. Figure 1 illustrates the message transferred by colors.

Visual symbols, as the carrier of information and the unity of form and content, have the functions of formal expression, information narration and information communication. Susan Langer, an American semiologist and artist, points out that the role of symbols in design is to formalize experience and objectively present experience in this form for people＇s observation, logical intuition, perception and understanding [15-16]. This requires that the visual symbols used in the design can not only refer to the information contents completely and explicitly but also possess its own meaning. In other words, the image of symbols is planed and beautified by means of the experienced and artistic modeling.

Vision is a selective cognitive system that responds to various levels of stimuli in the surrounding. In a complex information system, visual attention only focuses on strongly stimulating visual symbols, which, however, can trigger various physical and psychological

reactions. To this end, visual communication studies the theories and methods through which the physical world exerts a psychological and physiological effect through visual perception.
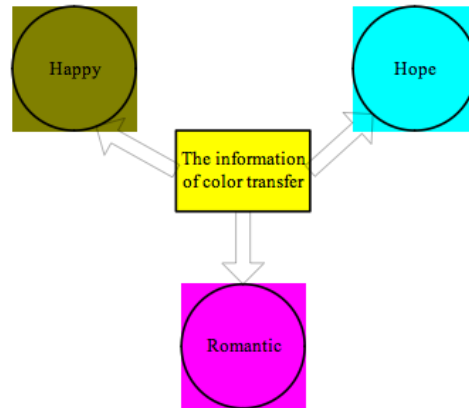

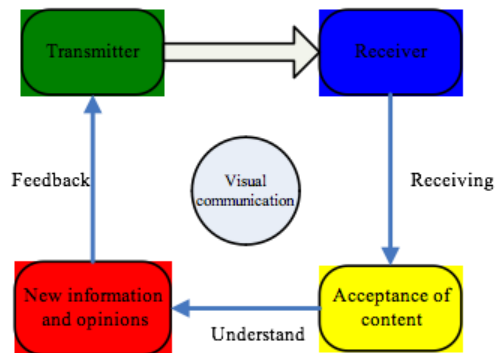**Figure 1**: The information of color transfer.

Figure 2: The process of communication.

Visual communication should be built on the concept of sender-medium-receiver. As far as information senders are concerned, the process of visual communication is the transformation from design ideas and design concepts into visual symbols based on different communication goals, namely the process of conceptual visualization. In terms of information receivers, the process is opposite, namely the process of visual conceptualization. Information penetrates and connects these two processes and serves as the carrier and the medium between senders and receivers. Figure 2 presents the process of visual communication.

2.2   Definition and Production Method of Webpages

Webpage is a page that is stored on the web server for clients and users to browse, also known as HTML files. HTML (Hypertext Markup Language) is a type of file that can be transmitted on the Internet and is displayed on the pages after being recognized and translated by a browser. In order to make a browser display the desired pattern of web page, it is a must to adopt the HTML language to set up the layout of format. Browser is a program used for locating and viewing HTML documents. Webpage includes the basic contents of texts, hyperlinks, pictures, sounds, images, etc. The features of webpage design are: 1) interactivity; 2) strong timeliness; 3) timely update; 4)

not limited by time and territory; 5) timely and accurate information feedback, as demonstrated in Figure 3.
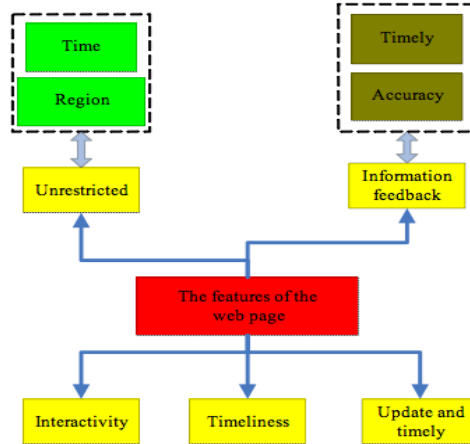

Figure 3: The features of web design.

Webpages are divided into four layers: frame, layouts, modules, as well as lists and data blocks. The framework of a webpage basically includes head, body and end. Also, menu should be added under the head, as indicated in Figure 4. The webpage layout divides the contents in #Main into a few blocks. The typical left-right structure in #Main is represented by #Layout_1 and #Layout_2.

Figure 4: The layout of the web page.

3 VISUAL ELEMENTS IN WEB DESIGN

Network information communication is interactive information with visual, auditory and interactive visual communication globalization with sound, image, picture and text. Modern designers, a network artist, represent the emergence of a new culture in the future eyeball battle. They integrate the graphic information on the network to design a beautiful and pleasing interface, giving viewers a strong visual impact and appeal. Future designers must master the ever-changing computer hardware and software technology and flexibly grasp the expression of visual new vocabulary. The Internet will be a new stage for design. Its infinite information resources, interactive graphics and high-speed and high-efficiency features have a huge impact on traditional design media. The network economy has also had a profound impact on the design industry.

According to the China Internet Network Information Center (CNNIN) as of June 2007, the number of Chinese Internet users has reached 162 million (Figure 5), second only to the US 211 million Internet users, ranking second in the world. Compared with the end of 2006, the number of netizens has increased by 25 million. Compared with the same period in 2006, the number of netizens has increased by 39 million within one year. The annual growth rate of Chinese netizens has reached 31.7%, entering a new round of rapid growth. The rapid growth of the Internet has provided a broad space for web design, and it also puts higher demands on the quality of design.
From the perspective of per capita resources, China currently has an average of 70 domain names per 10,000 people, which is twice as high as 22 domain names in June 2006. The basic resources enjoyed by Chinese people have greatly increased.
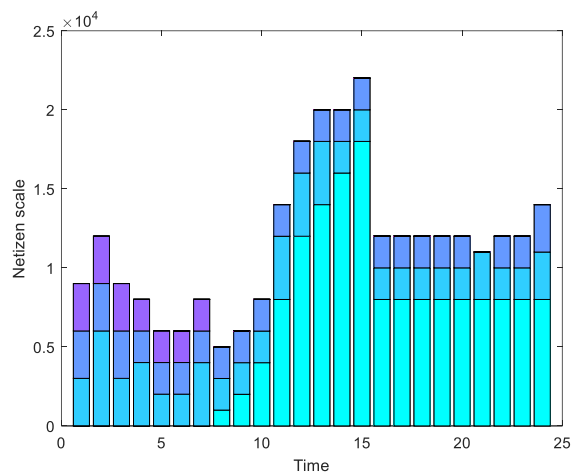

Figure 5: China's netizens' size and annual growth rate.

As shown in Figure 5, Figure 6, and Table 1, the Internet is composed of a large number of websites, which are composed of many web pages, so the web pages constitute the basic elements of the Internet. As a brand-new design field, web design is not only the continuation of graphic design in the information age, but also the new development direction of graphic design. Several web pages attract audiences through visual elements and realize the communication of information content.

	amount	Proportion of total domain names
CN	6, 149, 851	67.0%
COM	2, 301, 912	25.1%
NET	553, 372	6.0%

ORG	174,304	1.9%
Total	9, 179, 439	100.0%

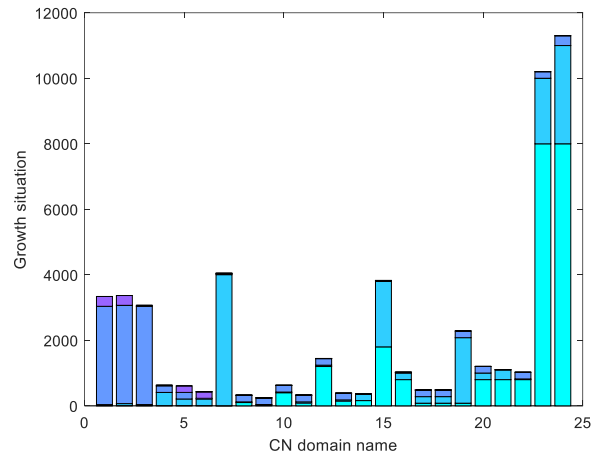**Table 1**: Number of domain names in China.

Figure 6: China's CN domain name growth.

In order to maximize the visual communication function of web pages, the web pages become truly readable and novel Internet carriers. The design of web pages must adapt to the mentality of people's visual processes. Therefore, in the expression of webpage information, flexible and reasonable use of visual processes and optimal horizons, organize natural and smooth visual orientation, and accurately utilize the functions and formal aesthetics of each visual element to make it orderly and geographically smooth. Each department performs its duties and does its best to make the structure of the plane visual elements have the order, the order of the size, the primary and the secondary, the strength and weakness, the virtual reality, the visual center full of tension, the clear visual orientation and the balanced and reasonable spatial layout. It allows us to complete the visual journey of beauty in the organization of an orderly visual element, leaving a beautiful visual impression. Thereby achieving the accuracy and effectiveness is of information communication.

3.1 Texts

Texts have been an important carrier of information communication since ancient times. Today, texts are also a subject that cannot be overlooked in web design and an indispensable visual element. There are two major advantages to using texts as the main visual element: (1) from the point of view of effective information dissemination, when texts are used to describe objects, the information cannot be easily misunderstood and can be conveyed very accurately and clearly; (2) from the perspective of the speed of information dissemination, text-based information is transmitted faster. Compared with pictures and videos, texts have relatively low requirements for the Internet, making the browsing smoother [8].

In web design, the selection of fonts is a science. Each font has a different style and emotion. Also, the choice of font exerts a great influence on the overall effect of the final web page presentation. The current font library in the computers supplies designers with a substantial number of font choices. In this regard, websites with different themes should have different options. Figure 7 illustrates the website of the People's Government of Anhui Province. Most of its

texts are in the font of bold, which offers a serious, prudent and strong perception as well as a strong identification, thus being a suitable choice for government websites.

Figure 7: Anhui government website.

Point, line and surface are the basic form elements shared by web design and printing graphic design. When designing with dots, lines and surfaces, web design and printing graphic design have the same artistic rules. The point elements in the graphic design of printing are static. There are not only static points in web design, but also dynamic points. A static point refers to a stationary point in a flat design; a dynamic point refers to a dynamic point that appears in a web page through the use of multimedia technology. Therefore, the use of points in web design is more flexible, and dynamic points can affect the viewer's visual process. Therefore, points are very important elements in web design and are the most basic elements.

As shown in Figure 8, in the design of webpage pages, the attributes of points can be used to summarize the ideas conveyed by things into the structure of points, thereby creating a variety of point shapes, which play a role of "pointing" in the picture. On the other hand, points can be repeated, gradual, dense, and other different ways to create a visual form with endless changes. The same size and the same form of point shape form a zigzag line structure, giving people a sense of movement and clearly expressing the concept of navigation. This is a "line" composed of points. Re-examining the points in web design from the perspective of art design, mastering its characteristics and visual characteristics, and studying the artistic rules of web pages is the basic skill of web designers. On this basis, based on human visual experience and psychological effects, the benzene quality understands the objective world and expresses it with a new concept and way of thinking. This is the essence of web design.

3.2 Graphs

Graphs can transfer information. In web design, as an important visual element, graphs have a unique charm and is the visual element that was first used in web design except for texts. Compared to texts with the same area, graphs hold stronger interestingness, attract users' attention more easily, and provide users with better impact and visual experience. However, texts and graphs have a complementary relationship. Texts can explain the meaning of graphs. In turn, graphs are a more intuitive expression of texts, play a supporting role for texts, and enables users to browse the web in a more relaxed manner. For instance, Figure 9 shows the official website of Huawei, whose homepage uses a picture of mobile phones. In this way, users can clearly understand its main business.
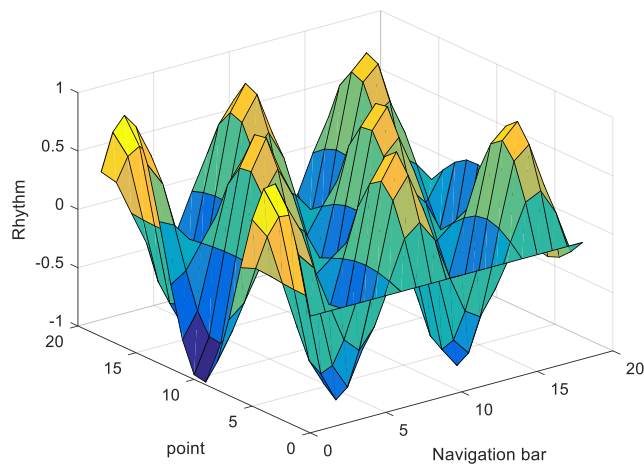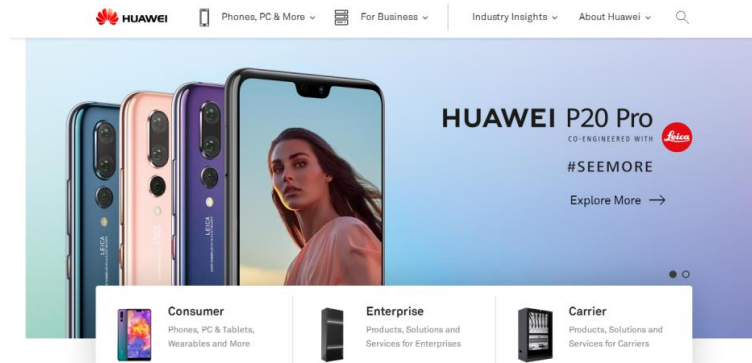
Figure 8: Navigation Bar Design - Point of Rhythm.

Figure 9: HUAWEI website home page.

3.3 Colors

In web design, colors can be used as an ambassador for the communication of language and emotions and can be organically combined with contents to highlight the themes. People generate different psychological feelings in sight of different colors. In web design, the emotional experience brought to users by colors is crucial. For this purpose, the colors adopted by webpages also require the careful thinking of designers. On basis of the research, in web design, reasonable color matching can differentiate the primary and secondary relation of information and classify the information, making it easier and more efficient for users to browse. The applications of colors in both web design and graphic design share numerous similarities and follow the basic theory of color such as hue, lightness, purity, and coolness and warmth. Figure 10 shows the homepage of the international Alibaba website which selects the warm color of orange as the dominant hue and gives people a pleasant, warm and friendly feeling. At the same time, orange can stimulate people's nervous system and raise the purchase rate of customers to some extent. When the contour is dark, it is softer than when using a hard edge. The shape of the face can be expressed in a variety of ways to reflect the three-dimensional sense, but also can produce rhythm, dynamic, transparent and illusory feeling. The simple geometric surface itself has certain ideographic features, such as the square and solid shape, the solid and stable triangle surface, the intimacy

and life sense of the elliptical surface. Many graphic images in web design use squares. One of the reasons is that web pages are relatively simple to make, and squares are direct and effective design elements. Entering the page design, the rounded square application makes the page feel healthy and generous, and full of intimacy and life.

Figure 10: Alibaba international station home page.

As shown in Figure 11, in the process of graphic image design, we should not only be good at creating independent "face" shapes, but also be good at organizing various types of "faces" to create harmonious and organic graphic images. The combination of faces is flexible and diverse. A picture may be juxtaposed, stacked, and interspersed with several faces. The method used depends on the desired visual effect. The faces in web design are also static and dynamic. They can play a role in the reasonable allocation of page space, while also reflecting the sense of three-dimensionality, rhythm, etc., the dynamic surface of web design can affect the viewer's visual process.
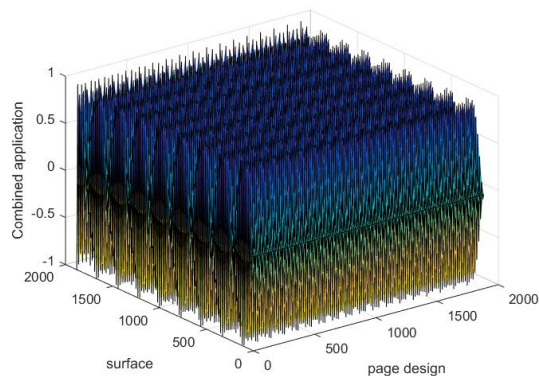

Figure 11: Page design-surface combination application verification.

In addition, color is an indispensable visual element in graphic design. "The feeling of color depends on the function of the eye, it is a physiological phenomenon, and at the same time it acts on the mind through the impact of the feeling. The web design and the graphic design of the printing have their own characteristics, which use the same color to some extent. Laws, such as: uniform color, harmonious color matching, color meaning function. The primary function of web pages is to convey information. Color is an important element in creating an orderly visual information flow. Designers use color distribution to make different the type information is classified and arranged, and the visual area of the web page is divided. Different color distributions are used to give the viewer different psychological effects, and the primary and secondary order are well distinguished, so that the webpage has good legibility and convenience. Orientation, resulting is in an orderly visual process.

4   CONCLUSIONS

An excellent web design should have three criteria: functionality, effectiveness of information communication and aesthetics. This article focuses on the application of visual elements in web design, conducts in-depth research on the presentation, features, roles and significance of the application of the main visual elements including texts, graph and colors in the current web design, makes discussions in combination with relevant cases, and provides some suggestions and theoretical guidance for the current web design. The rational and flexible use of these visual elements in the practice of web design can upgrade the usability and aesthetics of webpages so that users can have a better experience when browsing the web.

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