

Elements of Web Interaction

Yang Zhang^{1*}

¹ College of Fine Arts and Calligraphy, Sichuan Normal University, Chengdu, China

Email Address

958232761@qq.com (Yang Zhang)

*Correspondence: 958232761@qq.com

Received: 9 January 2024; **Accepted:** 31 January 2024; **Published:** 13 March 2024

Abstract:

With the continuous development of science and technology, today's society has entered the information age. The continuous breakthrough of high-tech new technologies has played a huge role in promoting the development of many fields, and has also played a good driving role in the further development of China's economy. With the comprehensive popularity and rapid development of the Internet in recent years, the production of web pages has also made remarkable progress, to achieve the perfect combination of network and design and aesthetics, to achieve the convenience of work, but also to bring people a good visual experience. In this paper, the author analyzes the elements of web interaction, and provides more effective help for designers to design web pages.

Keywords:

Web, Interaction, Constituent Element

1. Introduction

Interaction design is a new discipline that focuses on user interaction experience. It was proposed in the 1980s by Bill Moggridge, one of the founders of IDEO, at a design conference in 1984. From the perspective of information visualization, abstract information data is presented in visual form through the medium of computer interface, and a humanized, convenient and smooth human-computer interaction mode is formed [1]. In fact, interaction design is a discipline about how to create new user experience, which can help people expand the interaction ways and Spaces in work and life, help users and products to have good "communication", so as to enhance the interest and freshness of users' work interaction, specifically, to create new user experience. From the perspective of users, interaction design is a technology that can make the use of products more simple and efficient and make people feel happy in the process of use [2]. The quality of web interaction design is related to the success or failure of a product, and the analysis of its components has become a key part of the design process.

2. Web Layout

The long-term existence and stable development of a website needs to obtain user recognition, and to obtain user recognition needs to improve the user experience of the website. Among the many factors that affect the user experience of a website,

page layout accounts for a large part. The layout design of the interactive interface of the website requires a good combination of technology and art, and designers need to

arrange and combine different functional plates in the web page to design an interface that meets the user experience. At present, the existing web page layout on the Internet can be divided into national font layout, horizontal font layout, left and right frame, upper and lower frame, T font layout, F font layout, POP layout, and three-font layout. According to the characteristics of automobile websites, six commonly used types are introduced [3].

2.1. National font layout and three-font layout

National font layout and three-font layout: the country font layout is also called the same font layout. At the top is the website's title, LOGO, navigation bar, etc., followed by the main content of the website. The left and right are the side navigation bar or information transmission, the middle is the main content of the page, and the bottom is some basic information of the website, contact information, user feedback, etc. This is also the most commonly used type of structure in web pages. As shown in Figure 1.

Three-font layout: The three-font web page layout is divided into three-segment structure layout, with different sections in the upper, middle and lower sections carrying different page information, as shown in Figure 1.

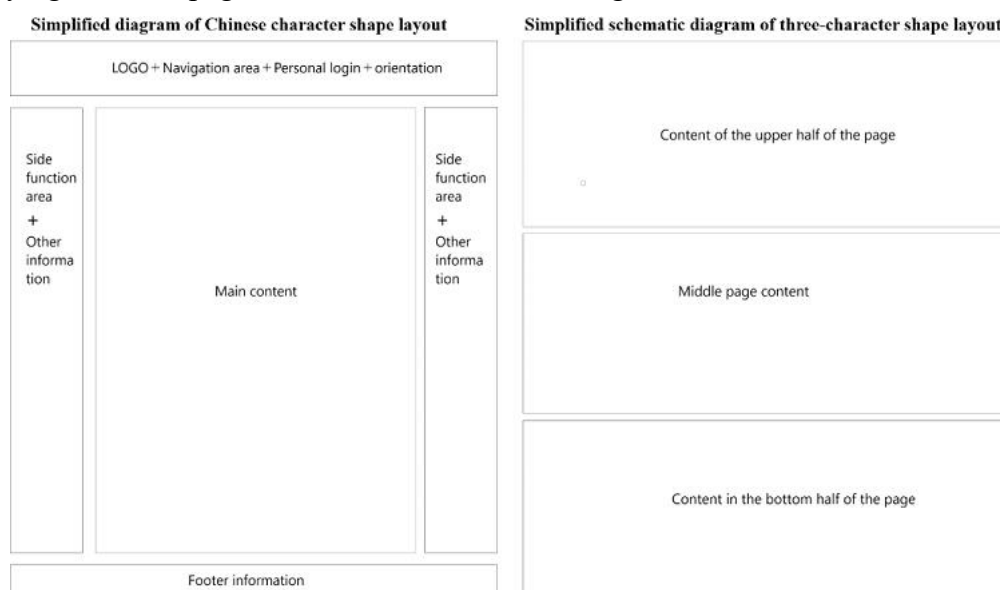


Figure 1. National font layout and triangular layout diagram.

2.2. F shape layout and T shape layout

F-font layout: mainly refers to when the user scans the content, the movement trajectory is similar to the letter F. This way allows users to get the information content faster, so it is named F-layout. The user will first browse from the top of the page from left to right, where the browsing track forms the top bar of the letter F. Next, the user's eyes will scan vertically down the left side of the page to find interesting content on the page. When they find the target content, they will browse accurately around the target information. Under normal circumstances, the line of sight corresponding to the content of the user's second time will be much smaller than

the first time, which forms the second horizontal of the F word. Finally, the user moves his eyes to the left side of the page and continues to scroll down, as shown in Figure 2.

T shape layout: named for its resemblance to the English capital letter T. The website LOGO and navigation area [4] are designed at the top of the page, the left side is the side function area or other information display area, and the right side is the main content area of the page, as shown in Figure 2.

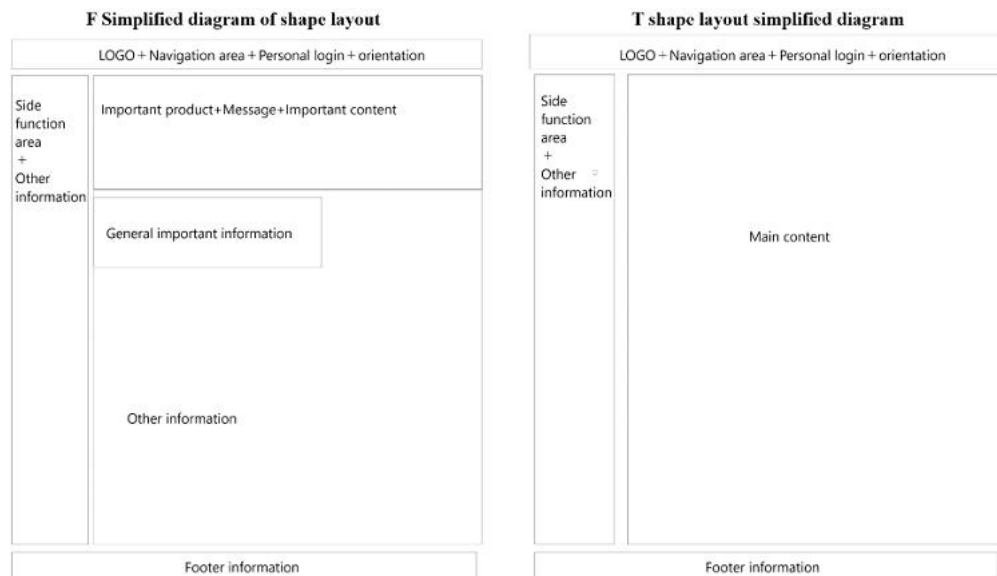


Figure 2. *F shape layout and T shape layout diagram.*

2.3. Up and down shape web layout and left and right shape web layout

Up-and-down layout: The up-and-down layout is similar to the three-font and left-right layout. The difference is in the web page frame with a top-down structure, as shown in Figure 3.

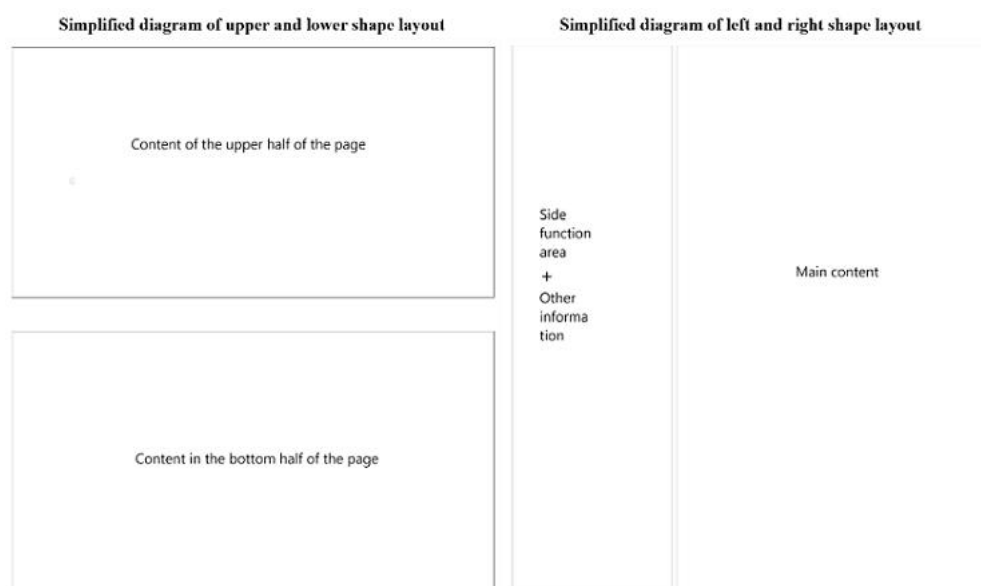


Figure 3. *Up-and-down layout and left and right shape layout diagram.*

Left-right layout: Left-right layout is often used in large enterprise websites and some industry forums. The left side is generally mainly for navigation function areas

and relevant important links, and the right side designs the main content of the website, as shown in Figure 3.

3. Web Navigation Bar

Through the literature review, the author shows that the navigation bar is one of the very important interface elements when the user visits the web page. The navigation bar usually contains the main parts or functions of a website or application to facilitate quick access to the target page and functions.

Navigation bar design directly affects the user's impression and experience of the overall website or application, so it is crucial in web design, a good navigation bar design has the following characteristics:

Easy for users to remember and recognize: Excellent navigation bar design allows users to quickly browse and select the content they want to visit. The fixed location of the navigation bar is often familiar and easy to remember.

Scalability and flexibility: As a website or application grows in size, the navigation bar needs to support more options, menus, etc., as well as a flexible mechanism to handle different types of navigation and hierarchy.

Beautiful and generous: A good navigation bar has a simple Easy to understand font size and friendly interaction styles to focus users' attention on their valuable links or interaction elements.

In today's web design, the layout of the navigation bar tends to be diversified, and there are the following common types:

3.1. Top navigation bar

The top navigation bar, usually at the top of the page, is a common layout and is especially suitable for more concise websites and applications, as shown in Figure 4.



Figure 4. Diagram of the top navigation bar.

3.2. Side navigation bar

Side navigation bar: generally located on the left or right side of the page, with the UI design style is generally more modern and fashionable. When the screen is not wide enough, the sidebar is usually hidden and interfaces with the title bar in the form of a telescopic button, as shown in Figure 5.

4. Page Response Design

The response design of web pages should achieve the goal of two stages: one is the goal of usability; The second is the user experience goal. Usability is the most basic function required in interaction design, while user experience is the psychological feeling brought to users by the entire interaction process designed by designers^[5]. The usability of interaction design in web pages is first reflected in the analysis and statistics of data and information, etc., after ensuring the effectiveness of information, excellent web interface is designed to improve the user's interaction and aesthetic experience. Well-designed response design can improve the user's choice and feeling of information and shorten the operation time. However, if the product positioning is not accurate, the designed page will lead to users' misunderstanding or misinterpretation of the information, reducing the readability of the information. Secondly, on the basis of good visual expression of the page, the response design of the page can increase the interest and exploration of the user in the process of interactive experience, such as the conversion between the page animation and the static page and the change between the whole page and the part of the page. In the process of interacting with the information in the interface, the user can subjectively filter, browse and filter the information. This is user-centered information dissemination.

As shown in Figure 8(a), an Icelandic telecommunications company offers a unique microsite for its smart home devices, an interactive demonstration site belonging to Nova products. If you select a product type from the top navigation bar, the page will display the location of the item in the house, while the mouse click position will produce a response effect, so that users can more intuitively see their selected products, as shown in Figure 8(b).



Figure 8(a). Home page of Iceland Smart Home website, **Figure 8(b)** When a user selects a network function.

After the user clicks, the website will display a series of smart home products for the user to choose, when the smoke alarm is selected, the installation position of the smoke alarm will be displayed on the left, and the product information and price will appear on the right; When the video surveillance system is clicked, the information of the camera and other supporting facilities will appear, as shown in Figure 9.

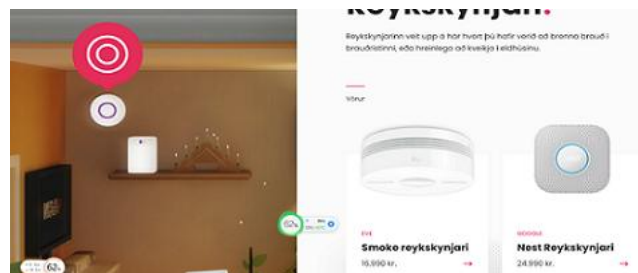


Figure 9. Click on the smoke alarm page that pops up.

5. Web Interactive Information Multi-Level Experience

The information content expressed by the web interface, the user first sees the visual image presented by the web page. Different from the boring and boring form, the web interface emphasizes the user's interactive experience; At the same time, in the process of interaction, users should find the interesting relationship behind the data as much as possible. When a website presents information in a concise or modern way, this direct sensory experience triggers an emotional response from the user, which further translates into inner feelings. Web pages use visual, auditory and tactile aspects to create sensory experience brought by interactive information, so as to provide users with a pleasant emotional experience.

5.1. Visual experience

The sense of visual experience often requires users to be infected by certain information in a specific situation. Designing an interface with visual appeal can not only improve the vividness of the page, but also improve the quality of visual communication of the page. In terms of visual experience, graphics and text are important factors that affect the experience.

5.1.1. Visual graphic experience

First of all, the most typical visual graphics to the user is the performance of the dynamic floating interface. Visual graphics can enhance the effect and tension of the entire web interface, and also better meet the growing needs of users for interactive experience. Figure 10 A website dedicated to global weather forecasting and meteorological data visualization services (Ventusky) established by Czech Meteorological Company, the meteorological data visualization portal is built by relying on the company's meteorological experience and real-time monitoring of climate data, so that users can obtain multi-regional climate change anytime and anywhere. Ventusky website is developed through the combination of global map and real-time weather monitoring, providing visual data such as temperature, precipitation, snow layer, freezing height, dynamic wind, etc. After users open the website, the system will automatically locate and display climate change according to the user's IP address, and users will switch to the temperature expression mode when selecting the temperature function. Yellow represents the temperature of 10 to 15°, green represents 0 to 5°, blue represents 0 to -5°, the closer the warm color represents the higher the temperature. When the user selects the wind speed function in the web page, the warmer the color indicates the higher the wind speed, and the cooler the color indicates the lower the wind speed. The same is true of the precipitation graph on the right. The trend direction of all the small white dots on the diagram indicates the local airflow trend. The whole page information has visual interest and vividness, and users will not feel boring in the process of understanding the information.



Figure 10. Czech Meteorological Company website.

The second is the real form design. By incorporating images of real objects into visualizations, designers use modern high-definition screens to display real objects, thereby stimulating the user's visual perception, and the advantage is that this presentation can also cause changes in other senses.

Figure 11 shows the heat ratio of different cookies. In order to attract users, attractive cookie images are used on the interface. This image is derived from taking photos of real cookies.

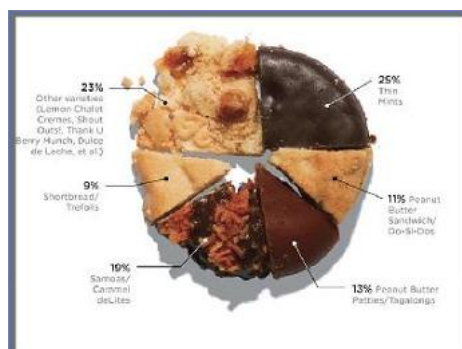


Figure 11. Cookie heat visualization real shape.

5.1.2. Visual text experience

In web design, the expression of text has a very important meaning. In addition to conveying information and explaining the content of the website, the design of the text can also enhance the appeal and aesthetic value of the page to the user by enhancing the visual effect. As one of the most important carriers of web interface, text plays a very important role in web pages. Therefore, in the process of web design, designers can not ignore the fine processing of text. Web designers through clever font selection and layout, can convey information at the same time, improve the user's sense of benefits to the web page, so as to effectively promote the interaction between users and the web page. The characters in web pages can be summarized as: uniqueness, legibility and modeling.

Uniqueness. Uniqueness means that each font should present a unique style, so as to highlight its personality characteristics and make people have a deep impression on it. Taking into account the needs and elements of different fields, we need to use smart design techniques to create font styles that are suitable for different industries, cultures and brands. By focusing on the uniqueness of font design, we can create more beautiful and distinctive web pages, and win better responses and comments from users.

Legibility. Legibility of text is very important, so that users can accurately obtain the required information in a short time, which is also a key factor in improving the efficiency of interaction and user satisfaction of the website. Good legibility of text content helps users quickly understand the content and form an overall cognition. Legible fonts in web pages can also produce an instant visual information exchange effect, thus attracting users' attention and enhancing the attractiveness of web design.

Modeling. The shape design of the font directly affects the performance of the sound, shape, color and other aspects of the text. Only on the basis of reasonable use of various modeling principles and skills, designers can create a font style rich in personality and beauty, and cause users' attention and recognition. Therefore, we

should pay attention to the styling characteristics of fonts in web interaction design, and pay attention to

its relationship with the brand, culture and market needs Seek coordination between them, so as to successfully improve the efficiency of information dissemination^[6].

5.2. Auditory experience

In the web interface, hearing is one of the important ways for people to communicate with information. Information visualization is usually presented by the interaction of visual and auditory. When the user focuses on a certain information but cannot understand it, the web page prompts the user through auditory information, which helps the user to further understand. Sound plays an important role in information visualization to enrich and complement the visual graphical interface [7].

5.3. Tactile experience

Haptic experience means that the user experience is no longer sitting in front of the screen and observing the connection between information and data, but interactive operation with the mouse and finger and web page to obtain information [8]. Especially with the progress of today's science and technology, haptic design has been applied more and more in the fields of computers, tablets, electronic watches, mobile products, etc. By participating in the changes of information graphics on the screen, a certain part of the user's body is fully mobilized to improve the user's tactile experience.

As shown in Figure 12, FWA Creative Interactive Design website is a cool website in the UK. It has an information touch screen interface operated by the user. The whole visual information operation interface is changed by the user dragging the figure image. When the right mouse button is long pressed, the character will start to cast magic at the eyeball, which greatly enhances the user's interactive experience.



Figure 12. FWA Creative interactive design website

6. Auxiliary Elements of Web Interaction

6.1. Dynamic and timeliness

6.1.1. The visual dynamics of web interactive presentation

Although the way people observe the world in daily life is usually through three-dimensional space or multi-dimensional system, the information used to describe events is limited to static paper or web plane, and the communication and exchange between the information sender and the information receiver can only be one-way. The visual presentation of interactive page information breaks this limitation and

transforms the audience's reading into an active, dynamic and information acquisition way. Compared with traditional 2D graphical interface, interactive information in web pages is more dynamic and diverse.

The interactive information visual interface is changed into a more dynamic form, which is mainly divided into two kinds of dynamics: one is the animation effect of the graphics itself, and the other is the dynamic graphics gradually formed and changed in the process of user interaction. This dynamic nature not only improves the efficiency of information transmission, but also makes the entire information data more vibrant and promotes users to read and understand more deeply. Cool club website is a web bridge game website, the mouse hover will trigger the text shaking effect, followed by a variety of dynamic interaction effects, so that the page content is rich and interesting, the entire page information with the user's mouse movement and click the interface graphics change, so that it carries a lot of rich information and dynamic visual form. Both in terms of visual experience and information transmission function, it is a complete and ingenious interaction design, as shown in Figure 13.

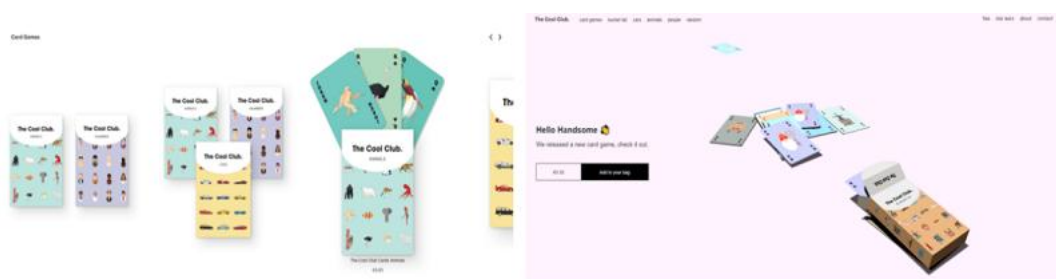


Figure 13 Cool club bridge game website.

6.1.2. The timeliness of web information transmission

In today's information age, the development of network technology has greatly accelerated the speed of information release and dissemination. Compared with traditional print media such as newspapers and magazines, which need to wait for typesetting and printing, and TV and radio require time-consuming production processes such as post-editing, information on web pages can quickly form a visual interface through specific programs and software, and present ongoing events and hot topics in the first time. This information can then be shared by users and distributed across the Internet. The fast reading development of Internet technology has narrowed the distance between countries in the world, and people can communicate with each other on the same platform, making the audience more willing to share with others in real time.

6.2. Tips and feedback

Prompts and feedback are ways to provide information, guidance and confirmation to users in the process of web interaction. At a time when computers needed to enter specific instructions to perform corresponding operations, Geoff Raskin pioneered the simple and convenient interactive operation mode in graphical interfaces, and invented the “click” and “drag” functions of the mouse. These innovations have certainly taken modern web interaction research a big step forward. Under the influence of Geoff Raskin, people began to explore the interactive behavior of web pages on the PC. The mouse operation function has been expanded, making the interaction in today's web pages more diversified and rationalized. The most common

interactive behaviors used by users include mouse movement, left click, left click, and roller scroll.

In web interaction design, the user's inherent cognition will dominate their own operational behavior. For example, in Figure 14, when the user sees Google, GitHub and Facebook, there is no explanation or introduction in the web page, and the user knows that it is a place to log in with the account and password of different platforms. After repeated operation and practice on multiple web pages, the user will form a cognitive memory in his mind.



Figure 14. An interactive website login window.

In the process of information interaction, the function of page prompt and feedback is very important. When the user input and output, through different forms of interface elements, sound, image and physical displacement to help the user remind themselves of the result of the operation. In web design, the content of prompt and feedback mainly includes information, warning, error and confirmation [9].

The attention allocation model of psychology shows that users will take up a lot of attention resources when faced with unfamiliar or uninterested operations. When delayed feedback occurs in web interface operations, the user's attention will focus on the vicinity of the action to pay attention to the interaction outcome. The main area around the input box is where the user receives feedback. Graphics can help with cognition, allowing users to get feedback more quickly and move on to the next step of interaction.

Figure 15 shows the user login page of Rockstar Game fighting platform. After the information input is completed, click to log in. If the information is wrong, a red font will appear near the error message, and the input box will change from normal black to red, indicating errors and warnings. This interactive program setup will allow the user to browse the text behind the alert icon and find out the reason for the error [10].

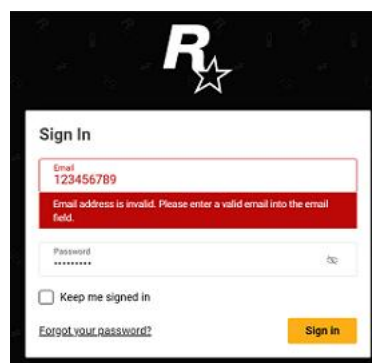


Figure 15. The Rockstar Game message is incorrect.

7. Conclusions

To sum up, for web interaction design, the most important content is the constituent elements of web interaction, which play a crucial role in the quality of web design.

Therefore, web interaction designers must effectively grasp the components of web interaction, make it more perfect, and then provide users with a better user experience, so that the elements of its design are in line with the needs of users in today's era. Among the components of web interaction design, interface design is the first thing to be considered. Designers should carry out reasonable layout of web interface and choose reasonable layout according to the type of web page. In the navigation bar function design, it is necessary to choose the appropriate navigation bar mode and classification according to the theme and function of the web page; At the same time, it is necessary to choose the interaction effect of the web page according to the needs of today's users, and respond to user interaction in a timely and reasonable manner. The visual, auditory and tactile design of the web page should echo the theme of the web page, and bring users a natural and smooth experience, which is in line with the sensory cognition of most users. Web interaction design is a very complex work, which not only requires the interaction designer to effectively fill the graphic design information, but also needs to clarify the user's inner feelings and use needs, so that all elements can be reasonably and effectively integrated. However, the web page designed by fully considering the various elements described in this paper must be closer to the needs of today's users.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

Funding

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

References

- [1] Hu, J.X. Discussion on interactive information visualization design in web pages(in Chinese). *Art education*, 2015, 08, 300.
- [2] Feng, Z.B. Research on Web interface interaction design based on user experience(in Chinese). Hunan University of Technology, 2018.
- [3] Hu, Y.; Wang, Y.H. Research on evaluation index of website user experience based on AHP(in Chinese). *Archives of Zhejiang*, 2014, 02, 8-11.
- [4] Liu. C.Q. Research on the application of visual selective attention in web interface design(in Chinese). Jiangnan University. 2014.
- [5] Liu, D. Research on interactive information visualization design in web pages(in Chinese). Jiangnan University, 2014.
- [6] By Garrett, Translated by Fan, X,Y. Elements of user experience: User-centered Web design(in Chinese). Bei Jing, China Machine Press, 2008, 35-38.
- [7] Liang, R.S.; Yang, J. Web art design (in Chinese). Bei Jing, China Machine Press, 2011, 1-7, 69-93.
- [8] Liao, H,Y. Digital interface design (in Chinese), Bei jing, Beijing Normal University Publishing Group, 2010, 13-21.

- [9] Zhao, G.G. E-commerce web page interface visual design elements analysis (in Chinese). *Farm staff*, 2020, 12(01), 164-168.
- [10] Qiao, L. Research on information graphics in web interface design(in Chinese). Shanghai Jiao Tong University, 2010.



© 2024 by the author(s); licensee International Technology and Science Publications (ITS), this work for open access publication is under the Creative Commons Attribution International License (CC BY 4.0). (<http://creativecommons.org/licenses/by/4.0/>)