Research on Visual Thinking of Computer UI Design Based on User Interaction Experience

Wei Wang¹, Wang Li²

¹School of information technology and Engineering, Guangzhou College of Commerce, 511363, China
²School of Electrical and Electronic Engineering, Guangzhou institute of science and technology, 511363, China

*Corresponding author e-mail: ww1985@gdlgxy.edu.cn

Abstract. UI design (hereinafter referred to as UID) is an interface design concept that attaches importance to User Interaction Experience (hereinafter referred to as UIE), which is a way to improve user experience through visual communication technology. Therefore, UID has unique personality and taste, which will bring the audience corresponding visual senses, such as shock, impact, comfort, freedom, etc. Through UID, we can build habits that are more in line with user cognition, which can help the audience recognize user design more. With the popularity of computer technology, human-computer interaction technology has gradually diversified, which requires us to study the UI technology. We must cultivate Visual Thinking (hereinafter referred to as VT), which will better complete the interactive experience. Firstly, this paper analyzes the related concepts. Then, this paper analyzes the guidance of VT cognitive process to art design. Finally, some suggestions are put forward.

Keywords: User Interaction Experience, Computer UI Design, Visual Thinking

1. Introduction

With the rapid development of mobile devices, people have higher requirements for visual design, which can help us pay more attention to interface design. Through visual design, the audience can have a beautiful and friendly interface style, which will bring the audience comfortable visual enjoyment [1]. Through visual design, we can shorten the distance between the audience and the product, which will improve the comfort of human-computer interaction [2]. Therefore, UID has become more and more important, which has become an important technology of interface design style. Visual style is a way of independent application of content, which needs to be designed within the scope of the existing art. Therefore, we need to maintain the unity of style, which can help test the designer's art understanding ability. In design, graphics, text and color are the basic elements of visual communication art, which is
closely related to UID [3]. Through the rational use of visual communication design, we can convey a better visual communication effect, which will help to complete more design ideas [4].

2. Related concepts

2.1. UID

The full name of UI is user interface, which is the art of visual communication and visual display, including mobile game interface, mobile app interface, web button, etc. UID has been accompanied by people's daily life, which has become an indispensable technology in life. Through the UI, the product can have a good UIE with the audience, which will be easier to accept the user's welcome [5].

2.2. Visual communication art

Visual communication art was popular at the world design conference held in Tokyo, Japan in 1960. Visual communication is the visual language communication, which can better carry out visual communication. Through media, we can use visual graphics, images or patterns to convey information, emotion and culture, which can achieve the ultimate goal [6].

2.3. The relationship between UI and visual communication art

Visual communication art is a comprehensive embodiment of usability and interaction design in UID. VT is the perfect combination of perception and thinking as well as art and science, which can closely connect human's most instinctive visual perception with graphic design [7]. Under the condition of functional design, UID can assist interaction. Therefore, we need to really meet the user's perception requirements, which can self realize the aesthetic requirements [8].

3. The guidance of VT cognitive mechanism

This paper formulates the relationship between VT cognitive mechanism and guidance, as shown in Figure 1.

![Visual query](image)

**Figure 1.** The relationship of VT cognitive mechanism

3.1. Visual query

VT brings the objective physical world to users. Users can form a series of specific visual search experience according to their educational level, social status and experience. Through visual query, we can find and select the required information. Designers need to carry out visual design through VT query mechanism. A good designer needs to carefully analyze the visual task, which can fully understand and grasp the target information users want to achieve [9]. Through visual design, we can satisfy the users
to find the information they want as soon as possible, which can improve the operation efficiency of users. Designers need to analyze the user's visual experience and physiological conditions, which can grasp the user's visual rules. Through the use of Gestalt theory, we can carry out differentiated design, which will adopt multi-level visual structure to meet the user's visual query [10].

3.2. Visual processing

Visual processing includes visual consciousness in the cognitive process of VT. First of all, vision should pay attention to screen out the needed information. Attention stage is the key to reduce the cognitive burden of information users, which needs to correctly attract users' attention to the target information. Through the selective attention mechanism, we can filter the information that users are not interested in or useless, which will greatly reduce the amount of information that needs to enter the post-processing [11]. In order to help users to recognize quickly, visual designers can build visual information with clear structure and logic. By providing cognition for some new information, we can assist consciousness to complete cognitive tasks as soon as possible. At the same time, we should fully consider the cost of users for acquiring and processing new information, which can complete the learning of new things. Through efficient cognitive tools, we can meet the cognitive needs of customers [12].

3.3. Visual memory

VT is always extracting experience knowledge from memory, which can serve for cognitive activities. Therefore, visual memory has a very good inspiration for the design. The more experienced and knowledgeable the designer is, the more effective he can dig out the connotation and relationship of information, which can find a solution to the problem. When designing, designers need to query a lot of information, which will be stored in visual memory. In this way, we can form a clear visual query. Then connect the information stored in the brain with the information received by the outside world, and the designer can carry out design innovation [13].

4. Application of VT mode in UID

4.1. Application of VT in 3D interactive UID

Plane graphics are light and concise in visual sense. 3D graphics have a sense of volume and weight in the visual sense. Therefore, different mapping style adjustment can show different visual effects. 3D technology can provide the audience in the traditional two-dimensional performance, which will be difficult to achieve, new visual experience. Nintendo, Sony, Microsoft and other manufacturers have developed a series of electronic, computer and game products applying 3D technology. When users ensure the traditional application principle of VT, the VT in 3D interactive UID begins to improve the applicability of devices. However, cognitive load, technology limitations, hardware support and so on have become the new application problems of digital technology. Sony first proposed the application of VT in 3D interface design, which has broken through the application limitations. Therefore, 3D technology can better adapt to the visual needs of users. This paper lists the application of VT in 3D interactive UID, as shown in Figure 2.
4.2. Application of game interface framework in UID

Mobile games can draw a mind map draft after browsing the game planning text and planning form, which can preliminarily decompose the overall UI architecture of mobile games. By defining the art style, we can draw the original UI framework. In this paper, "the wild and the future" as an example, this is a horizontal version of the UI interface. After browsing and extracting the planning table, the game framework is roughly divided into 11 interfaces, as shown in Figure 3.

4.3. 3D interactive animation

3D interactive animation is mainly divided into perceptual and control type. At present, 3D interactive animation can ensure the fluency of animation, which usually does not use complete light and shadow real-time rendering effect. Most of the 3D interactive animations play the rendered sequence frames through trigger points, which can realize the interface interaction. By controlling the number of model faces and baking the scene map, we can greatly reduce the computational burden of the computer, which can achieve a better visual balance in the interaction between the user and the interface. The 3D interactive animation is shown in Figure 4.
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Figure 4. 3D interactive animation

5. Conclusion

Through the study of UID, we can have more UIE, which can complete the visual analysis, including style, color, light sense, composition, icon and so on. Therefore, through the rational use of visual communication design, we can convey a better visual communication effect, which can also make the audience get better UIE.

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