



# Research on visual design of emergency information based on user experience

Ruiyuan Liu

Graduate student of Hubei University of Technology, Wuhan, Hubei, 43000, China

873027648@qq.com

**Abstract.** In recent years, the probability of emergent public health events continues to increase. When emergent events occur, people often have to break through their own psychological barriers to obtain important information. Emergency visual design is not only the artistic creation of transforming information data into visual forms, but also focuses on considering user needs and paying more attention to the scientific design. This paper takes the user experience as the starting point to discuss the interaction and visual communication of information through the expression of visual design and the push of big data algorithms in the case of sudden acute events, so as to better meet the needs of different audiences and promote the modernization of China's emergency management system.

**Keywords:** Information visualization; User experience; Visual design; Emergency management.

## 1 Introduction

In the event of sudden and unknown disasters, the public will often panic, anxiety and confusion. In this case, information is often blocked, and it is difficult to accurately and quickly convey information to the audience, which brings negative effects on the government's management work and their own psychology. Therefore, it becomes essential to inject humanistic emotion into the visual communication of information. As one of the important contents of visual design, information visualization is complementary to each other. Visual design can better visualize information and convey the art expressed by data. Combined with the realistic background of the era of big data, the theory of data visualization is humanized<sup>[1]</sup>.

In the face of sudden psychological pressure, people in disaster events will produce a series of stress reactions, such stress response caused by stress stimulation will cause people's body and body to produce certain rejection reactions, in such a state of tension will show a series of changes in emotion, cognition and behavioral activities, and may also lead to physical discomfort and induce various diseases. Severe cases can result in loss of consciousness or sudden death. Therefore, the processing and processing of

information need to control the user's cognitive ability, understanding ability and memory ability<sup>[11]</sup>.

While strengthening the national emergency management system, visual design should uphold the purpose of "serving people"; The humanization of the design can convey the information more accurately, improve the user's security awareness and response ability. When the event does not occur, make adequate preparations for preventive work to reduce the occurrence of the event and the loss caused; After the event, teach people how to save themselves and each other, and provide people with the confidence and courage they need to face difficulties and challenges.

## **2 Overview of Emergency Management System for Emergent Public Health Events**

The persecution of human beings caused by natural disasters is great and unexpected, and the occurrence of disasters threatens the safety of human life all the time. According to the Ministry of Emergency Management's release of the Basic Situation of National Natural Disasters in 2022, a total of 112 million people were affected and killed by various natural disasters in the year, and 554 people were killed or missing due to disasters. 2.428 million people in emergency relocation; 47,000 houses collapsed; 796,000 damaged in different degrees; The affected area of crops is 12071.6 thousand hectares; The direct economic loss was 238.65 billion yuan. It can be seen that natural disasters have caused a huge impact on human society, and the country has a very important and urgent need to improve the ability and level of emergency management. Preparation or remedial measures for environmental and technical risks in the face of unforeseen emergencies. Emergency management is inseparable from the dissemination of information, and the collection, processing and transmission of information is the key to emergency management. The visual dissemination of information enables various government departments to coordinate and deploy plans, timely release important information and prevention and control measures, so as to ensure the health and safety of the public and effectively respond to emergencies<sup>[7][9]</sup>.

## **3 User-Oriented Visual Visual Communication of Emergency Information**

When unexpected events come, data and information need to be disseminated quickly and accurately. Information visualization, as an efficient and intuitive means of data presentation and communication, shows its value and effectiveness in multiple dimensions. Traditional information visualization is the use of computer programs and mathematical models to transform complex data into intuitive graphics and images, but the data generated by computers usually do not have the unique emotional expression and understanding ability of human beings, lack of care and empathy, lack of unique artistic style and creativity, users often cannot quickly and accurately accept the blunt data information generated by computers. The visual design-based emergency information

visualization design is that the designer makes some artistic intervention to the information visualization data obtained by the computer algorithm, so as to make the ordinary information more "emotional" and give people emotional comfort and care. The critical study of the information visualization of computer algorithms is a search for creative expression and critical reflection on interdisciplinary cooperation for designers.

Martin Wattenberg, an American computer scientist and information visualization expert, said that "good data visualization should help people quickly understand and interpret data, discover patterns, trends, and relationships in the data, and make more informed decisions." For the dissemination of emergency information, visual design should follow the basic visual characteristics of human beings in artistic creation, and design with the goal of meeting the needs of users and reasonably dividing visual recognition areas, combining the visual preferences and visual styles of users, so as to make the information more "human" on the basis of visualization and bring good experience and feelings to users. When processing information, we should take people's psychological and physiological feelings as the starting point, and fully consider the balance of human visual system and the correlation between information. In the actual design, the designer should consider whether the user can identify the information, whether the visualization of the processed information is strong, and whether the information is highly identifiable. At the same time, the design needs to be inclusive, considering the user's aesthetic habits, age and cultural background, etc., on this basis, the visual and ornamental elements are injected<sup>[11]</sup>. The visual presentation of this kind of information usually means that designers map out information data through visual design, "label" users through big data algorithms and calculations, and achieve reasonable distribution, so as to obtain a "rule", push according to the background of different people, and communicate and feedback with the help of multimedia system platforms, so as to achieve the universality and inclusiveness of design. When users obtain relevant information on mobile phones, computers and other interfaces, they can express their views or ask questions through the Internet interactive platform, and through the screening and screening of big data, the national emergency management and deployment department can get immediate feedback from users, help coordinate work and deployment, accelerate the transmission speed and circulation of emergency information, and reduce people's panic caused by the unknown<sup>[6]</sup>.

#### **4 Emotional Emergency Visual Design Based on User Experience**

User experience is people's subjective feeling, cognitive impression and response to the used object. When people have anxiety, tension and other behaviors due to the persecution of unexpected events, the design should consider their visual experience. Further understand the characteristics of users' cognitive thinking and visual thinking, optimize the terminal reception effect, pay attention to visual thinking and cognitive thinking, pay attention to skills and information level, pay attention to people's visual process

and cognitive characteristics, and improve people's experience from visual experience while ensuring the accuracy of information<sup>[5][13]</sup>.

The key to easy identification and understanding is mainly reflected in the selection and application of graphics, colors and text. Through the use of images, colors and text related to users' emotions, users' emotional resonance can be aroused, so as to improve users' attention and awareness of information. Enhance the user's sense of security and trust with safe, stable and reliable elements, such as shields, locks, protective covers, etc. Use clear, concise, easy-to-read fonts and colors to improve the readability and understandability of information, thereby reducing user anxiety and unease. Add interactive elements, such as buttons, links, etc., so that users can participate in the emergency response, thereby enhancing the user's sense of participation and responsibility<sup>[10]</sup>. According to the needs and characteristics of different users, personalized visual design is carried out, such as special design for the elderly, children, disabled people and other special groups, to improve the pertinence and effectiveness of information, and deliver visual information to users<sup>[2][12]</sup>.

#### **4.1 The User's Ability to Receive Information -- Perception, Cognition and Memory**

When people receive information, they will go through a series of information processing processes, including perception, attention, memory, understanding and reaction. Psychologist W.J. McGuire developed the theory of "cognitive consistency[3]." On this basis, Paul Rand, a famous American designer and design educator, emphasizes simplicity, clarity and consistency in design, believing that people are more likely to understand and remember a design with cognitive consistency when they receive information.

##### **(1) Perception Ability**

The reception of information by human brain is a complex process, which is affected by many factors, including individual cognitive ability, emotional state, cultural background, acceptance degree, etc. When the user is in a nervous and anxious emotional state, it will be difficult to concentrate on reading all the information; American scholar Dale Carnegie proposed the "Affective Filter Hypothesis" in the early 20th century, which holds that people are affected by emotional factors when receiving information, and people with positive emotions are more likely to accept and understand information. On the other hand, people with negative emotions may be resistant to information<sup>[8]</sup>. Affective filtering theory emphasizes the influence of affective factors on information reception, which has important guiding significance for designing effective information presentation mode and improving users' information reception ability. Therefore, emergency visual design should display the information with graphic, color, typesetting and other visual factors, so that the user can see at a glance.

## **(2) Cognitive Ability**

It is a learning process for human brain to receive information and then to recognize information<sup>[4]</sup>. There is a positive correlation between memory ability and information content. Steve Krug, an expert in the field of user experience design, has put forward the principle of "simplicity first". He stressed that the design should follow the principles of simplicity, intuition and easy to understand, so that users can quickly grasp and operate.

## **(3) Memory**

Information visualization is to make information easier to be remembered by users through information processing. The process of information receiving is the process of human brain processing and memorizing information. Clear information reduces the processing of human brain and makes it easier to be remembered. The designed information can be based on the user's preference, making the transmission of information more artistic and enhancing the memory of the human brain. The "selective attention theory," proposed by British psychologist Donald Broadbent in 1958, states that people selectively focus on information that is relevant to their interests, goals, and needs, while ignoring other information. The theory emphasizes the importance of information and the influence of relevance on information reception<sup>[12]</sup>.

# **5 Conclusion**

The delivery of traditional information is based on scientific and official communication; Visual information visualization design is to add emotional elements to ensure the scientificity of information transmission. The fundamental of social development is the development of people. In the era of rapid development of information age, visual communication of information is not only limited to the communication itself, but also needs to consider the degree of audience perception and acceptance of information, as well as the audience's emotions.

The visualization of emergency information should be scientific and artistic. It is a kind of emergency visual design based on the user's visual experience and psychological comfort. Through the exploration of visual language in information visualization, the style is more diversified, adding some unique human emotions on the basis of the original blunt visual expression, which is the combination of science and art. It optimizes the audience's psychological experience when receiving information in the face of sudden disasters. Through big data analysis and positioning of crowd preferences, accurate information delivery can be achieved, and through computer interaction platforms, managers, designers and users can realize information sharing and information interaction in one dimension, playing a substantive role in the case of information blocking and public panic.

## References

1. Zhang R, Zhao L, Wang X. Research on information visualization for digital media design methodology based on big data technology [J]. *Applied Mathematics and Nonlinear Sciences*, 2024, 9 (1).
2. Moreno L C M, Vivas L, Sarmiento R E A. user experience and redesign of a cognitive stimulation web lab for older people with and without mild cognitive impairment [J]. *Alzheimer's & Dementia*, 2023, 19 (S19):
3. Du Qin. Clothing brand image on consumer purchase intention [D]. Shanghai university of engineering science, 2020. The DOI: 10.27715 /, dc nki. GSHGJ. 2020.000417.
4. LIU Yi, Ouyang Yiyu, ZHOU Hongshi. Research on visual design of Information weight from Cognitive Perspective [J]. *Packaging Engineering*, 2023, 44 (20): DOI: 10. 19554/ j.cnki.1001-3563.2023.20.032.
5. Xu C, Xue Y. Information Visualization Design under Cognitive Thinking and Visual Thinking [J]. *Journal of Humanities, Arts and Social Science*, 2023, 7 (8):
6. Polo Hualong. Analysis on the strategies of news visual communication in the era of big Data [J]. *News Research Guide*, 2023, 14 (17): 116-118.
7. Ministry of Emergency Management releases the basic situation of natural disasters in China in 2022 [J]. *Disaster Prevention Expo*, 2023, (01): 26-27.
8. Luo Lingyu. Implications of the affective Filter Hypothesis on College English Listening and speaking teaching [J]. *Overseas English*, 2022, (15): 148-149.
9. Sun Shifang. Optimization of emergency management capability system [N]. *Economic Daily News*, 2021-10-23 (010).
10. ZHANG Xin, Yang Kai, BAN Naiming. Research on Visual Language of Information visualization Design [J]. *Electronic Production*, 2017, (10): 94+ 72. DOI: 10. 16589/ j.cnki.cn11-3571/tn.2017.10.050.
11. Wang Wei, ZHANG Zihan. Analysis on visual experience and visual element design of network interaction Design [J]. *Hundred of Art*, 2015, 31 (S2): 112-114.
12. Chen Zhixia. *Social Psychology* [M]. Posts and Telecommunications Press: 201601.343.
13. Amir D, Marko N, H. T L. Feelings of Being for Mobile User Experience Design [J]. *International Journal of Human-Computer Interaction*, 2023, 39 (20): 4059-4079.

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

