Study of Interactive Display Design Based on Multi-dimensional Sensory Experiences

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Abstract: This paper starts from the carrier of interactive display design, combined with case analysis and interactive display of multi-dimensional sensory experiences commonly used in design, such as visual experience, auditory experience and tactile experience, and summarizes five kinds of interactions using multi-dimensional sensory experience. Showcase the design approach. It is concluded that the application of multi-dimensional sensory experience in modern display design can not only promote the effective transmission of display information, increase the interaction between exhibits and audience, bring good physical and psychological experience to the audience, but also promote the display design along the people-oriented The concept of sustainable design and the development of a more scientific, efficient and integrated direction.

1. Introduction

With the advancement of science and technology, the development of society, the change of human concepts, and the speed of information dissemination, interactive display design has undergone tremendous changes in terms of interactive carriers, display media, and display methods. From static to dynamic, from reality to virtual, from plane to space, from limited to infinite, interactive display design has gradually changed the past display mode based on static exhibits, focusing on multi-dimensional experience development. The multi-dimensional experience pays more attention to the complete experience process of participants from entering the space to getting out of the space: from vision, to hearing, to touch, to smell, to the sensory experience of taste, and the way in which emotions are connected and storytelled. It is a multi-dimensional form of experience that interacts with participants. This paper studies the interactive display design method that pays attention to multi-dimensional sensory experience at home and abroad, in order to adopt reasonable design and configuration, advanced media and technology, rich interaction and communication in the display design, so that the display design can better participate. The person's emotional resonance makes the display design more participatory, valueful, and persuasive, so as to achieve the purpose of positive and effective information transmission.

2. Show the Interactive Carrier in the Design

Display design can be divided into static display and dynamic display according to the way of display. Among the two different presentation methods, the carrier of interactive display is also different.

2.1. "Interactive" carrier in static display

Static display refers to the way in which content is displayed in a static manner in space and time. The carriers of interaction in static display are mostly the exhibition hall itself and exhibits, props or exhibits that are basically static in space and time. The state of these carriers themselves is static, but the goal is to interact with the audience and induce the attention of the audience. Compared with dynamic display vectors, static display vectors have weaker ability to induce viewers' attention.

2.2. "Interactive" carrier in dynamic display

A general dynamic display is a way of displaying content that is moving in time or space. The

dynamic interactive display carriers are mostly dynamic exhibits, people who play the role of display, mobile clients, digital multimedia display screens, digital projection interfaces (such as free planes or elevations that can project multimedia interactive effects such as graphics, images, animations, etc.) , Internet pages, etc. The goal of dynamic interactive display is to better interact with the audience and induce viewers' attention behavior.

3. Show the Multi-Dimensional Sensory Experience in the Design

Along with the rise of the experience economy, there are more and more experiential and interactive designs in the display design. Experience is a positive and beautiful impression that a person achieves at a certain level of physical strength, emotion, and spirit. Any good experience will give the experiencer a deep impression[1]. The multi-dimensional sensory experience in the display design mainly refers to the human visual experience, the auditory experience and the tactile experience. Although the interactive display design is inseparable from the interactive experience with the audience, only the reasonable sensory experience of the audience can enhance the effective dissemination of the displayed information and enhance the interest, interaction, creativity and rationality of the display.

3.1. Visual experience

Visual experience is a universal and specific experience. It is an experience generated through a special abstract process based on 'seeing'... The so-called 'visual' is a kind of positive observation, induction and integration. Behavior is the state of experience of a certain form of language formed by the perception, selection, and analysis of the image in the eye, and further discovers the level of the image's connotation factors and reconstructed forms in 'seeing' [2]. In the exhibition space, about 80% of the effective dissemination of information is displayed through the viewer's vision.

3.2. Hearing experience

Hearing is an important feeling after vision. It is the sound that passes through the outer ear to reach the tympanic membrane, and then transmits the sound wave to the inner ear's auditory receiver through the tympanic membrane vibration. The energy conversion is finally transmitted into the brain and produced [3]. American musicologist Marion once said: "Sound is an audible color, and color is a visible sound." In the display design, in a space with insufficient brightness, the visual function is disabled, and the hearing is not affected. When the space is limited, the visual function is blocked, and the hearing still works. Appropriate auditory experience can give the audience an effect of "not seeing the object, smelling it first", allowing the audience to think of a specific picture, inspiring the enthusiasm or creative inspiration of the exhibition, and touching the deeper audience with visual information. The heart, inducing complex emotions, thus enhancing the interaction between people and the display of information.

3.3. Tactile experience

Tactile sensation is a kind of skin sensation, which is a feeling of distinguishing external stimuli from skin contact. Touch can not only convey information, exchange emotions, but also bring us a rich psychological experience. The famous Japanese design master Kurokawa Yasuke stated in the book "Century Design Proposal - Future Archaeology of Design" that we are "moving from the 20th century in the visual era to the 21st century in the tactile era."

3.4. Other sensory experiences

Other sensory experiences mainly refer to sensory experiences such as taste and smell.

3.5. Comprehensive application of multi-dimensional sensory experience

In recent years, there has been less and less display design for mobilizing a sensory experience of the audience alone, and more is to rationally mobilize the visual, auditory, tactile and other multi-dimensional sensory experiences of the audience to display the design. For example, the Pen

project developed by the Cooper Hewitt Museum in New York, USA, each visitor will receive a "design pen", which can be used to scan the QR code of the work of interest; can be graffiti on the platform Create art works; you can also listen to music in the immersive experience room to design wallpapers, and project your own design or collection of wallpapers onto the wall. At the same time, this information can be saved in the memory of the design pen, and according to the code sent by the staff, the artist can view, download and review the exhibition at any time. Imagine how wonderful this is the impressive viewing experience.

4. Interactive Display Design based on Multi-Dimensional Sensory Experience

4.1. Introducing the display space design of multi-dimensional sensory experience

The exhibition space is the existence of an entity, including the physical space and the virtual space divided by the exhibition hall. The "events" in space, even if they are "non-events" and rich in space, can fully express the space, time and experience, and complete the process of information transmission and acceptance [4]. Try to combine spatial design with visual, tactile and auditory experiences to create a unique, open and flexible display space. For example, the Danish pavilion at the Shanghai World Expo attempts to connect the indoor space of the pavilion with the outdoor space, using a gradually rising ring. The organic space reasonably connects the content of perception, vision, and tactile experience, such as mobilizing the tactile design-the roof track, cycling, etc.; mobilizing the visual design-the "Little Mermaid" bronze statue, circular pool, indoor display Corridor, etc.; mobilize the design of the auditory - sound display. The museum extends the indoor display to the outside, and introduces the outdoor landscape into the interior, creating a smart and open display space, which increases the interactive and interesting content of the audience.

4.2. Introducing the exhibit design of multi-dimensional sensory experience

In the past, exhibits were mostly based on static exhibits. When the audience faced a large number of static exhibits, it was impossible to attract attention to all the displayed information. Therefore, in the exhibit design, the main and minor exhibitions were displayed. And the display method for the processing of multi-dimensional sensory experience can highlight the key points and effectively increase the delivery of display information. For example, the skeleton exhibition hall of the Smithsonian National Museum of Natural History in Washington, DC, combines skeleton exhibits with a multi-dimensional sensory experience. The audience uses the AR App called "Skins & Bones" to open the mobile phone with its own camera and scan it in the window. The skeleton exhibits, you can see that the skeleton becomes a "real animal" with shape and "blood and flesh" in the mobile phone. Robert Costello, manager of the Smithsonian National Museum of Natural History's outreach department, said that the APP's interaction with the audience is very big. The "Skins & Bones" app was downloaded on the phone and applied in the showroom. The average dwell time of the audience before an exhibit increased from 1 minute 34 seconds to 14 minutes.

4.3. Introducing the multi-dimensional sensory experience with humanistic care display configuration design

That is to pay attention to the use of ergonomics in the display design, pay attention to the respect and attention of the disadvantaged groups, pay attention to the use of barrier-free facilities, blind electronic voice guidance system, color guidance system and other series of humanized design for the exhibition crowd and the weak The group offers the greatest convenience. For example, the Natural Ecology Exhibition Area of the Hong Kong Museum of History has used voice electronic navigation systems and sound simulations to create an "audible exhibition" for visually impaired audiences. The exhibition hall simulates the flora and fauna environment of Hong Kong six thousand years ago, and the audience walks. Among them, you can hear the roar of birds and the roar of animals, as if they were there.

4.4. Application of digital display media introducing multi-dimensional sensory experience

The digital display mainly refers to the use of computer technology to inform the physical

exhibits and related knowledge, and then rely on projection, touch screen, infrared sensor, multimedia integrated interactive device and other media to display. Currently used computer technologies are: human-computer interaction technology, computer multimedia technology, virtual reality technology, ar augmented reality technology, stereo display and sensor technology [5], 3d holographic projection technology, infrared sensing system, touch screen technology and voice-activated system, which combine these technologies with the display content, can bring surprise and pleasant personalized experience to the audience. This process of participation and experience It often leaves a deep memory for the audience. From static to dynamic, from 2d plane display to holographic image display, from physical exhibit display to real world information and virtual world information "seamless" integrated display, digital display breaks through the traditional way of platform, board, frame and lighting. Breaking through the limitations of time and space, the exhibition will not only be limited to the exhibits in the exhibition hall, but will extend the display to the network and mobile. The digital display not only greatly reduced the cost of the exhibition, but also achieved the green and sustainable development of the exhibition.

4.5. Human-person interactions that introduce multi-dimensional sensory experiences

In the previous Expo pavilions, there are many venue service personnel who wear special costumes and props that represent the image of the country, the nation or the company, and communicate face-to-face with the audience through expressions, language and physical movements to promote the country. The culture and image of the nation or enterprise. For example, the National Museum of Natural History's Dinosaur Fossil Museum has a transparent studio on one side, where archaeologists clean up fossils on the spot. In order to make the audience more clear, the staff connected their microscopes to the camera and showed them on the TV. on the screen. The staff side has a description board that says what they are doing. This on-site viewing of the archaeologist's on-site work has brought the archeology, fossils and audiences closer together.

At present, the interactive design of people is no longer limited to face-to-face communication and interaction between people, but also extends to people using "tools" to communicate with people. For example, the Brooklyn Museum of Art in New York, USA, used its own app app to achieve good results in interacting with the audience: viewers can see any work in the exhibition process to send photos on the app for anonymous questioning, and the staff will use the ask app. Answer in a timely and witty manner. The call app is a chat app that makes it possible for viewers to have a real-time conversation with a team of experts. This kind of anonymous communication is a more relaxed, intimate and easier way to communicate with others. The application shows that even with the latest technical tools, the interactive dialogue can be humanized.

5. Interactive Display Design Practice based on Multi-Dimensional Sensory Experience

The online Shandong Anti-Japanese War Memorial Hall, which was designed by the Shanshi Academy of Architectural Environment Design and Research Center of the author's unit, uses 3D modeling virtual reality technology, panoramic 3D dynamic browsing technology, Sun3D digital compression technology and other technical means. A virtual exhibition hall with visual, auditory, perceptual and other sensory experiences has been built on the Internet, enabling panoramic three-dimensional dynamic browsing. Visitors can touch from various angles by touching the mouse or wearing interactive devices such as 3D glasses. In addition, the museum also uses advanced Sun3D digital compression technology, which can compress 3D data up to 1:120. Users can use a mobile phone to enter the virtual exhibition hall and enjoy smooth navigation on the network. The 3D grand scene is interactive and interactive. In the design practice, we try to break through the constraints of limited display space limitations, geographical restrictions, and display time constraints of traditional physical pavilions, comprehensively mobilize the audience's visual, auditory, and perceptual experiences, and comprehensively utilize such digital display, scientific and technological achievements, The Internet and other ways have created a multi-dimensional sensory experience display space, reflecting the high efficiency, high interaction, low cost and sustainable design concept of the new era display space design.

6. Conclusion

The interactive display design method based on multi-dimensional sensory experience is to serve the design concept. They should be used appropriately and skillfully. Simply stacking multi-dimensional sensory experiences is not only a waste of cost, but also can not achieve effective interaction with participants. .The understanding of the display content, the presentation of the content logic, and the elaboration of the hierarchy are the souls that show the interactive experience of design. Only by fully understanding the spirit of the content displayed can we use the appropriate form of interactive experience to create value for display design.

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