

Research on Visual Communication Design in the Perspective of Museum Display

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Abstract. In the museum display, the unique way of visually conveying design information is based on cultural relic appraisal and exhibition appreciation, which has sufficient persuasiveness. As a medium for visually conveying design information in museums, it has distinct characteristics. The interaction between various visual media presented in museum design can mobilize the audience's various visual communication information presented in the design. Good visual communication design not only can better convey the visual communication design information from the perspective of museum display to the audience, clarify the distinct characteristics of visual communication design from the perspective of museum display, but also play a huge value and significance in the dissemination of visual communication design information in museum display. This article introduces the visual communication design elements in the traditional perspective of museum display. At meanwhile, simultaneously studies the visual communication design elements and their combination in the new museum presentation perspective under technological elements.

Keywords: Museum Display; Visual Communication Design; Visual Media; Elements.

1. Introduction:

There are two ways to present cultural relics: one is to present them in the form of appreciation, the other is to present them in the form of appreciation and description. Museum visual communication design can use the means of visual communication design to further enrich the cultural connotations displayed in museums, make the display forms of museums more diverse, and make the content of exhibition items more abundant. Therefore, as a visual communication designer for museums, it is necessary to fully understand the historical origin of museum exhibition items, familiarize with their related content so as to use visual communication design methods to make the museum's display and design have its unique artistic characteristics which makes the presentation of exhibition items has their own design cultural connotations. Visual communication designer also supply the visual communication design information presented in the museum's visual field which enabling most viewers to read the content in the cultural relic appraisal and appreciation exhibition field of view. [1] The core of visual communication design is to convey visual design information in the perspective of museum presentation to guide and persuade. This is also the simplest way for people to receive museum information.

Traditional visual communication design refers to the design activities in the visual communication space. In the perspective of museum display, a relatively multi element fusion of design elements is formed to convey visual design information dissemination in the museum display perspective. In addition to the three elements of graphics, cultural elements, non color elements and color elements, the lighting methods and new multimedia media, as well as the support of AR/VR high-tech applications that will strengthen people's understanding and recognition of museum exhibits. The visual communication design in the museum's field of vision is filled with a sense of cultural precipitation that allow people to appreciate the beauty of true arts and history.

2. Traditional Basic Three Elements

2.1. Cultural Elements

In the visual communication design of museums, in addition to incorporating patterns and colors to ensure the application and dissemination of museum visual communication, it is also necessary to truly understand the culture nurtured in museum visual communication. Not only to truly possess the soul and spirit of museum visual communication design, but also apply the same methods of visual communication design to museum design, so as to truly integrate museum decoration design and visual communication. [7]The purpose is to make the viewers and users appreciate the sparks generated by the collision of two different arts in their imagination and recollection.

2.2. Image and Data, Table Elements

Data, images, and table elements are a unique form of graphical language. Cultural elements, as well as image and visual elements, are irreplaceable. Graphic elements design some of the dull qualities, materials and related graphics in the exhibition into concise and vivid forms of expression that not only give people a sense of beauty, visualizing the dull graphics, but also typifying the complex visual communication design in the museum's exhibition vision expressing the content in the most concise and clear way. At the same time, according to the needs of the exhibition perspective, the concept of visual communication design information from the museum's presentation perspective is processed. For example, scientific analysis painting vividly presents the visual communication design information in the exhibition field of the Science Museum in the form of images and visual elements, making it easier for the audience to understand.

2.3. Colorless and Colored Elements

The alluring value and significance of non colored and colored elements are a very effective way of communication. Firstly, the aesthetics of non colored and colored elements are closely related to people's subjective feelings. Different elements with or without colors can cause different psychological feelings. For the field of museum vision design, which relies heavily on visual impact to convey ideas and spirits, color is the key, and museum cultural and creative products have always showcased people's love for life and positive living conditions with bright colors.

3. Lighting - A Rendering Giant for Museum Displays and Exhibitions

Everything in sight comes from light. The exquisite cultural relics, artworks, and all beautiful visual experiences enjoyed in museum display are presented through lighting rendering. In the comprehensive information dissemination platform of museum exhibitions, lighting is no longer simply used for spatial lighting. It uses its unique language to decorate cultural relics, outline their exquisite forms, and set off artistic forms and environmental atmosphere. Lighting plays a very important rendering role in exhibition displays, It is the pillar of exhibition visual art. Unlike traditional visual communication design, through the application of contrast and transparent elements, lighting becomes a "rendering giant" for museum exhibitions and displays which more effectively showcasing the cultural connotations of the museum. [3]The mediation of different exhibition halls in museums through lighting elements can effectively guide the audience's senses, and the use of contrast between light and dark can focus the audience's attention on the items that need to be displayed in visual communication design, playing a prominent role. Lighting design is one of the most important design steps in museums. It is necessary to comprehensively consider the structure of museum exhibition halls, display characteristics, and visual effects for reasonable design. The suitability of lighting in exhibition spaces is usually judged from the following aspects:

3.1. Illuminance

There is an essential difference between brightness and illuminance. Luminance refers to the intensity value of light emitted from the surface of an object, regardless of whether the object emits light, reflects light, transmits light, refracts light, etc., as long as the light generated on the surface of the object is the brightness of the surface. Illuminance refers to the amount of light flux obtained per unit area on the surface of an object illuminated by light, which is the amount of illumination on the object, expressed in lux and represented by the letters Lux or Lx. The level of illuminance value is determined by the strength and projection distance of the light source body, that is, the higher the brightness of the light source body, the higher the illuminance; The closer the projection distance, the higher the illumination. Illuminance is a very important indicator for measuring the exhibition environment, which requires exhibition designers and museum lighting designers to have a comprehensive understanding of the characteristics of lighting, especially the applicable design of illuminance. It is necessary to ensure the visual effect of the exhibition and carefully consider it from the perspective of protecting the exhibits.

3.1.1. Color Temperature

Color temperature refers to the scale of the light color generated on the surface of the light source, expressed in "K". It is not related to the strength or size of the light source body. From a physical perspective, color temperature refers to heating a standard black-body, and as the temperature reaches a certain level, the color gradually changes from deep red to light red, orange yellow, blue white, and blue. When the color of a light source is the same as that of a standard black-body, the temperature corresponding to the black-body is called the color temperature of the light source. The higher the color temperature value, the colder the light color. The lower the color temperature value, the warmer the light color. The color temperature of a light source is the most basic information that people perceive through visual perception. The exhibition space mainly relies on artificial light sources, where the color temperature of artificial light sources can effectively enhance the atmosphere of the display space, playing a decisive role in providing viewers with comfortable visual information.

3.1.2. Color Rendering

Color rendering refers to the degree to which the color of an object appears when a light source illuminates it, which is called color rendering, reflecting the degree to which the color of the object is restored. The color rendering index is commonly represented by (Ra). The higher the Ra index, the better and more realistic the color rendering performance. The lower the Ra index, the worse the reproduction of the object's own color, leading to significant color deviation. At present, the color rendering index is divided into five levels: 90-100Ra 1A, 80-89Ra 1B, 60-79Ra 2, 40-59Ra 3, 20-39Ra 4. The color rendering of a light source directly affects the true presentation of the color of the illuminated object. Therefore, in exhibition display, it is necessary to maximize the artistic charm of the exhibits, allowing the audience to appreciate the true color charm of the exhibits. Therefore, the color rendering index has become one of the important parameters for selecting lighting fixtures in exhibition design.

3.2. Classification Design of Exhibition Lighting

Most museum exhibition halls use artificial light sources. Through functional analysis of exhibition spaces, the scope of lighting design can be divided into four categories: basic lighting, exhibition cabinet lighting, key lighting, and decorative lighting.

3.2.1. Basic Lighting

refers to the lighting of public areas in exhibition spaces. For example, audience flow areas, rest areas, interactive areas, etc. in exhibitions. These areas are usually based on indoor lighting design standards, combined with exhibition themes and artistic styles for overall environmental lighting design.

3.2.2. Exhibition Cabinet Lighting

refers to the lighting that specifically illuminates the cultural relics displayed inside the exhibition cabinet. The use of artificial light sources in cultural relics display cabinets is widely recognized as an ideal and controllable lighting method. However, the selection of light sources must be rigorous, and targeted lighting design should be carried out for cultural relics to avoid harmful light from damaging them.

3.2.3. Key Lighting

refers to the targeted lighting design of unique exhibits or special areas in exhibitions to highlight their importance, individuality, and artistic effects. For example, representative cultural relics exhibits, exquisite model exhibits, important site scenes, decorative walls, sculptural works of art, etc. in exhibitions. These lighting designs contrast with the surrounding lighting environment, creating a visually striking impression.

3.2.4. Decorative Lighting

refers to the use of intelligent control systems to generate static color or dynamic rhythm changes to enhance the environmental atmosphere and performance. For example, the decorative light strips in the exhibition, the exquisite patterns projected through the light source, and the internal light projection lights in the background image. The appropriate arrangement of these lights is conducive to the liveliness of the environmental atmosphere and can also bring a visual sense of hierarchy to the audience.

These four types of lighting designs are closely interrelated and rely on each other. Only by combining them organically can they serve and add color to the visual effect. Lighting, with its unique language, renders the individuality of the exhibition space, which can quickly and conveniently change the environmental atmosphere of the exhibition space and change people's visual perception in the environment.

3.3. Cultural Relics Unearthed from Guangzhou Archaeology

Taking the cultural relics unearthed from Guangzhou archaeology as an example, an exhibition showcases the development and changes of Guangzhou's city and its overseas exchanges over the past 2200 years since the Qin and Han dynasties. Therefore, the theme of the renovation of the lighting in the entire exhibition hall should tell a vivid story of Guangzhou's archaeology and its achievements, as well as the development of Guangzhou's city, through the contrast between the brightness and darkness of the lights and the change of the rhythm. The exhibition hall should be fully equipped with artificial lighting for display layout. In response to the problems encountered in the renovation and improvement of exhibition hall lighting, lighting renovation measures should be taken from three aspects: lamp selection, illumination design, and lighting layout. According to the exhibition design concept, the exhibition hall is arranged with regional lighting according to general lighting, local lighting, and key lighting, creating a narrative light and shadow effect with clear layers, reasonable distribution and outstanding effects. [5]

After the improvement and transformation of lighting, a high-quality visual light environment service is created for the entire exhibition, forming a complete museum display space that unifies content and form, light and carrier [5]. The use of light reflects the historical changes from ancient times to the present, making the entire exhibition experience smoother and more comfortable which playing a narrative effect of light and shadow, making it easier for the audience to immerse themselves. The effect of the lighting renovation in the Guangzhou Archaeological Exhibition Hall is shown in Figure 1. After the renovation, the lighting effect of the exhibits has been greatly improved, with balanced illumination, reduced shadows, and increased bottom brightness, which better displays the shape, color, decoration, and texture of the exhibits, allowing the audience to further understand the true history.



Figure 1. Lighting renovation in the Guangzhou Archaeological Exhibition Hall

4. Application of VR/AR Technology in Museum Exhibition Design

VR technology, as a cutting-edge visual technology not only with interactivity, immersion and conceptualization, but also combined with museum display design to form a VR+museum model, will perfectly solve the problem of lack of interactivity and interest in museum display design. At present, multiple technology companies and well-known museums around the world are exploring the combination of virtual reality technology and museum display design, and a large number of excellent works have emerged. With the support of VR technology, the way viewers interpret exhibits has changed. Instead of simply using their eyes to see, viewers actively participate in display activities through technology devices such as VR helmets, ambient images, simulation instruments, interactive projectors, touch electronic screens, etc. They participate in them through direct experience, and have a more intuitive understanding of the exhibits. This immersive and interactive experience enhances people's memory, At the same time, it also brings fun and novel experiences to the participants.[2]

Modern museum display design is committed to creating an atmosphere, striving to create an immersive feeling for the audience through visual, auditory, and sensory aspects, promoting resonance and guiding people to immerse themselves. The interactive composition experience created by VR technology is immersive, with a strong sense of realism, thus immersing oneself in it. This participatory psychological suggestion allows people to quickly accept and actively recognize and remember the emotions and knowledge conveyed by the exhibition, and to be clear and profound. The use of VR technology in museum displays can break through the limitations of the traditional display style in terms of spatial and temporal dimensions, significantly filling the gap in information storage. This is especially true for precious cultural relics that could only be viewed from afar. Through VR, history can be appreciated up close and even reproduced in VR, breaking through the limitations of time, space, and region. As shown in Figure 2, a museum creates VR virtual reality content through technological means, and the audience enters the virtual environment specially created by the designer through VR helmets, experiencing and reading history "firsthand".

AR technology has also played an interactive role in museum exhibitions, such as the equipment displayed at the Huanggongwang Digital Museum in Hangzhou, Zhejiang. (Figure 3) Tourists can simply scan the QR code and switch to virtual traditional ancient clothing on their mobile phone ports, where they can have conversations and interactions with virtual NPCs on the screen. The Hangzhou Huanggongwang Digital Museum, supported by existing VR/AR technology and equipment system, has built an interactive virtual scene of historical blocks, allowing viewers to fully immerse themselves in historical block scenes through online scenes, and explore and dialogue with famous local historical stories. At the same time, in the process of building a three-dimensional digital animation system, it is also necessary to fully consider the damage that Hangzhou has suffered during the millennium development process. Through the three-dimensional digital system, combined with disciplines such as archaeology, ancient geography, and cultural relics, the damaged ethnic cultural relics and historical blocks should be repaired to form a three-dimensional virtual simulation based cultural relics and blocks, breaking through the limitations of offline time and space, Providing the public with immersive scenarios that span time and space not only reproduces the style of historical neighborhoods, but also enhances the display effect of historical neighborhoods and ethnic cultural relics.



Figure 2. VR virtual reality content



Figure 3. Interactions with virtual NPCs on the screen

5. Conclusion

With the increasing integration of elements in the design of Chinese museums, the division of design is gradually refined. In addition to the three elements of graphics, cultural elements, non colored elements, and colored elements, today's lighting technology is rapidly developing, and lighting can quickly and conveniently change the environmental atmosphere of exhibition spaces, changing people's visual perception in the environment. The lighting design of museum exhibition spaces is no longer solely designed to meet the basic lighting and visual functions of the audience, but rather focuses on visual aesthetics and the protection of displayed cultural relics. Exhibition designers and lighting designers should collaborate with each other, effectively putting people first, fully considering the audience's visiting psychology and visual experience, and organically combining lighting functions, exhibition themes, cultural relic protection, and artistic styles to create a high-quality exhibition space that is overall coordinated, visually comfortable, and full of vitality for the audience. In the process of exploring digital display in museums, the role of VA/AR technology should be fully utilized. Based on the specific needs of digital display, a holographic path and a diverse content display system for digital display should be established. Relying on VR/AR technology complexes, the depth and width of cultural relics content should be explored, and innovation in digital display and improvement in display effectiveness should be promoted, enabling the digital activation and "life" empowerment of cultural relics, Enhance the recognition and

perceived satisfaction of the public towards the content of cultural relics. As an important component of the design process in the exhibition field of view, visual communication design in the exhibition field of view can enable museums to present visual communication design information in the field of view more quickly and accurately to the public. As an interdisciplinary field, the visual communication design presented in museums has its unique characteristics. The content of visual communication design in the perspective of museum presentation will be applied in future practical work.

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