Interactive application of VR technology in ice and snow landscape design

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Abstract. With the rapid development of computer technology, virtual technology has been applied to all walks of life, especially in landscape design. Through VR technology, we reduce the workload of designers, which will better complete high-quality work. At the same time, VR technology breaks through the limitation of traditional two-dimensional space, which can show the design scheme in 3D way. Through VR technology, we can intuitively feel the presentation effect of the design scheme, which will help designers improve the design scheme. Finally, the designer will present the user with a better quality of landscape design. VR technology has strong interactive characteristics, which will better manage and construct ice and snow landscape. Firstly, this paper analyzes the characteristics of VR technology. Then, this paper puts forward the VR application of ice and snow landscape. Finally, some suggestions are put forward.

Keywords: Ice and Snow Landscape, Art Design, Vr Technology, Interactivity

1. Introduction

With the development of modern science and technology, computer technology has been widely used in the development of all walks of life in our country, and it also plays an important role in the field of landscape design. VR technology can improve the quality of design, which can make the design more scientific. In landscape design, through the rational use of VR technology, we can improve the accuracy of art design, which will enhance the artistry and creativity of landscape design.

Ice and snow landscape art is a comprehensive art design, which integrates a variety of Sciences, such as traditional culture, landscape, sculpture, garden, architecture, sound and photoelectric, etc. Therefore, the ice and snow landscape design has the characteristics of diversification, regionalization and seasonality. The ice and snow landscape art in northern China has become an important cultural resource of winter landscape, which will promote the coordinated development of culture and economy in specific regions. With the continuous improvement of social and economic level, people's pursuit of ice and snow landscape art is not limited to space-time constraints. Therefore, people put forward higher requirements for the modernization of ice and snow landscape art, such as VR technology. With the rapid development of computer 3D processing technology, VR technology gradually presents the trend of low cost and rapid development, which has penetrated into many fields of people's real life. Through VR technology, we improve the operability of a variety of applied disciplines, which can fully realize human-computer interaction. Through VR technology, we design the plasticity and compatibility of ice and snow landscape art, which has broken the boundaries of time and space.
2. **VR technology features**
VR technology has a variety of characteristics, as shown in Figure 1.

![Figure 1. The VR technology features](image)

2.1. **Interactivity**
Once the real landscape is formed, designers can’t easily change it. However, virtual landscape designers can make changes as they like. Therefore, before making a scheme, designers can present the design scheme through VR technology. Then according to the feedback information of virtual image, designers can improve the scheme. Through VR technology, we can present the design scheme, which will present the information in the image.

2.2. **Sense of presence**
Through VR technology, we can present the appearance of things perfectly. To be exact, VR technology does not really exist, which will not have a substantial impact on the surrounding environment. Therefore, people can’t touch it, but it still has a certain sense of existence. Through three-dimensional technology, virtual things can be presented in the form of pictures, which will achieve extremely realistic effects. Therefore, VR technology can have an impact on people and the surrounding environment.

2.3. **Autonomy**
Although virtual technology is not restricted by objective conditions, designers can present their desired pictures as they like under the condition of technology. Through VR technology, our landscape design will follow the objective principle, which can’t violate the natural law. In virtual technology, designers can’t play freely. Through VR technology, we can get a sense of reality, which will be reasonable and scientific.

2.4. **Multi perception**
Perception refers to people's vision, hearing, touch and so on. Although the things presented by virtual technology do not exist objectively, they can still give people visual and auditory effects. The ideal VR technology can give people an intuitive feeling, which will make people know that it is a virtual thing, but it will still be affected.

3. **Specific process of landscape design based on VR technology**

3.1. **Application process of VR technology**
In landscape design, the main flow of VR technology is shown in Figure 2. First, determine the design scheme. By designing the plan for each scene, we can clean up the redundant lines. By modeling and adding materials, we can import simplified models in VR platform. By adjusting the material and lighting of the model, we can get the scene roaming animation.
3.2. **VR display of ice and snow landscape**

Based on VR technology, this paper constructs the process flow chart of ice and snow landscape, as shown in Figure 3. Through VR technology, we can get the best results.

![Figure 2. The Application process of VR technology](image)

### 4. Artistic forms of ice and snow sculpture landscape design

#### 4.1. Design form of space

The design framework of a landscape determines its final outline. Before the design of ice and snow sculpture, designers will first think about its spatial structure and general design model, so as to select a more
suitable angle to design the ice and snow sculpture landscape. Usually, the ice and snow sculptures we watch are closely linked with the majestic momentum and magnificent pictures. They are not only related to the northern people's character, but also can present the spatial three-dimensional sense of ice and snow design. The VR effect picture of the snow sculpture "game" is shown in Figure 4. Ice snow landscape design is the pride of landscape design industry in China.

4.2. Lighting and color design forms
The landscape design based on ice and snow finally presents transparent, translucent or color colors, which highlights the tranquility and solemnity of ice and snow, as shown in Figure 5, the ancient road. In order to give the ice and snow carving life, the designer added the light element to its transparent color. Just imagine how fascinating it is that the transparent ice and snow sculptures present a colorful scene under the lighting, which can not only attract people's attention, but also highlight the designer's innovative design talent. Ice sculpture landscape design is the pride of landscape design industry in China.

![Figure 4. VR rendering of snow sculpture game](image1)

![Figure 5. VR rendering of ice sculpture "ancient road"](image2)

5. Conclusion
The application of VR technology in landscape design not only improves the work efficiency of designers, but also reduces the functional workload of designers. At the same time, VR technology subverts the working mode and concept of designers, which breaks through the limitation of traditional two-dimensional space. Therefore, designers can display their own design scheme through three-dimensional space, which helps them feel the presentation effect of design scheme more intuitively.

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