Research on Interior Design Optimization based on Virtual Reality Technology

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Abstract. The professional knowledge structure system of interior design pays attention to the continuous improvement of the comprehensive quality of interior designers. Interior designers should not only master the traditional design skills, but also master the most advanced and cutting-edge new technologies, so as to apply them to the practical projects of interior design. Virtual reality technology based on building digitization is being applied in various types of high-end indoor and outdoor construction projects, which builds a real bridge between designers and users and greatly enriches the interior space art. Research on the application of virtual reality technology in the field of interior design will guide the development of interior design industry better, more scientifically and systematically.

Keywords: Virtual reality; interior design; optimal allocation; design experience.

1. Combination of Interior Design Knowledge System and Virtual Reality Technology

From the development direction of the professional knowledge structure system of interior design, we should pay attention to the continuous improvement of the comprehensive quality of interior designers. These comprehensive qualities are mainly reflected in: 1. Design performance ability system; 2. Thinking and innovation ability system; 3. Comprehensive application ability system. As interior design practitioners, in the face of the need to deal with a variety of information, people need to establish a top-down, virtual and real information processing environment, the core technology of this information space is virtual reality technology. This is also the reason why people pay more and more attention to design performance ability.

Virtual reality technology belongs to the field of computer science. It is the integration and application of various disciplines, the integration of computer, information, optics, dynamics and so on. It is also a synthesis of advanced sensor technology, image graphics, artificial intelligence, neural network and other science and technology.

Using virtual reality technology to show the content of interior design, enhance the expression form of interior design. Virtual reality technology greatly enriches interior space art, makes interior design more humanized, and makes interior design performance more rapid, scientific and real-time.

2. Ask Questions

The author has interviewed 12 students of different grades and 2 teachers on the application system of virtual reality technology. They are interior design majors. After using the virtual training system of interior design, they are selected by random sampling method. The interview adopts audio recording method to record the whole process of the interview, so that it can be included in the effect analysis.
2.1. Purpose of the Interview
1. After using, understand the recognition degree of teachers and students to the virtual reality technology application system of interior design.
2. From the experience of teachers and students, understand whether the function of virtual reality technology application system of interior design meets the requirements.
3. Understand the students' feelings on the friendly interface of virtual reality technology application system after using.

From the answers of the students and teachers interviewed, we found that students prefer the new mode of virtual simulation. They think that this technology is more interesting. The interface interaction of the system is relatively simple and fast, and the functions are basically complete. It can play the subjective initiative and consolidate the theoretical knowledge at the same time. However, some teachers said that the theoretical knowledge contained in the system is not comprehensive enough to achieve all aspects, the design effect is not exquisite enough, the experience is more general, and so on. A small number of students also reflected that the system still has some bugs which do not affect the normal use and high-performance requirements, and the system is not smooth to use, so the system needs to be optimized and modified in the future.

3. Reflection

3.1 Contradiction and Dilemma of Virtual Reality Technology
Modern interior design professional integrates a variety of high-tech, sound, photoelectric and other elements of high-tech products, the application of these high-tech products greatly enhances the interaction between people and science and technology. However, the application of virtual reality technology in interior design is weak. The author found that the students of interior design still use the traditional CAD, 3ds max, Maya and other design software in the practical teaching of a higher vocational college in Yangzhou. Although it has certain effect, but the time cost is too high, most of them need 15-30 days to complete the basic design and rendering, which is contrary to the efficient training teaching mode.

As far as current technology is concerned, the biggest difficulty of indoor scene virtual demonstration lies in the contradiction between modelling fidelity and rendering real-time. Because the virtual scene is close to the viewer, it requires the rendering to be very realistic. Therefore, the construction of the model has to be fine, which can consume a lot of time. Similarly, due to the restriction of computer performance, the more complex the model is constructed, the more difficult it is to achieve real-time effect in rendering, and the poor real-time performance will make it unacceptable to observers. This contradiction is common in the whole virtual reality system. Generally, it is necessary to choose a compromise between the accuracy and the rendering speed, that is, it can satisfy certain sense of rendering reality without causing dynamic discomfort to observers. Multi-level detail (LOD) method can also be used to generate different levels of detail for the scene, which can greatly reduce the computation of drawing. Some scenarios can also be pre-processed, such as the radiometric method, which can save a lot of computation of illumination during roaming.

3.2 Functional Structure of Interior Design 3D Virtual Platform
The interior design platform under the vision of 3D virtual vision technology and interactive design mainly includes interactive display, 3D virtual visual effect display and other modules, among which the interactive module function can specify the location of the landscape that needs to be drawn through the central computer. In this link, the central computer supports the naming and other processing of various indoor landscapes, and the naming is carried out according to the landscape redefinition program, and reasonable correlation parameters are set. The main function of the interactive display module is to process the interior landscape information and select the interior landscape interaction methods under different environments according to the obtained processing results. The 3d virtual visual effect display module can ensure that users can adjust and control the observation points randomly in the interior design platform, and understand the specific location of interior landscape from all aspects.
3.3 Configure Reasonable Interaction Functions
3D virtual vision technology is one of the common methods used by designers to construct interior design platform, which can ensure designers to obtain accurate landscape information. The main function of 3D visual virtual model is to obtain all kinds of landscape information under interactive environment, study the mapping relationship between different landscapes in an all-round way, and build corresponding 3D model through 3DS Max and other software. In addition, the determination of specific parts of the landscape is also an essential part of the interaction function. According to the location of the landscape, it can provide more intuitive and detailed information for the designer. After the successful implementation of interaction design, other indoor landscapes can also complete interaction design to ensure the realization of landscape scaling, movement and other functions. The interaction function in the interior design platform can be integrated with the interior landscape to provide more accurate information for the designer.

4. Beautiful Vision

4.1 Virtual Reality Technology Promotes the Development of Interior Design
The research of virtual reality in the field of interior design is to better, more scientific, more systematic guidance of the actual needs of the future development of the interior design industry, but also in order to better through the rationalization of the construction, through the means of digital virtual interior design practitioners with the lowest cost, the fastest speed to explore the diversity of indoor design work scene as soon as possible.

4.2 The Combination of Virtual Reality Technology and Interior Design Promotes the Development of Emerging Industries
As a new training method in the new stage of digital era, virtual training has the potential of long-term development under the promotion of VR technology, artificial intelligence, hybrid reality and other new technologies. Virtual training will be full of the possibility of unlimited development, and the virtual training system will also be concerned. I believe that the virtual training system will bloom everywhere and be applied in all walks of life, and the future can be expected.

4.3 The Role in Promoting the Birth of the Ninth Art of Mankind
With the advent and further development of virtual reality, some experts predict that a ninth art form will be born in the future. Exactly what the ninth art is like, people of different art categories have different imaginations. However, any art category and form are inseparable from the reproduction and experience of living environment, including the indoor environment. Although people cannot imagine how people interact with indoor scenes in the future architectural art form and how to give it full emotional colour, it is conceivable that the future art and social civilization will have great expectations for the development of virtual architecture roaming technology. Therefore, many international indoor space environments have begun to take the body of visitors as the carrier, and take personal experience as the entry point to build a humanized and emotional bridge for technology and exhibition art design. The development of new media and interactive art is based on a more open virtual simulation platform for interior design, injecting more new creative elements to create a diversified interior space in the future.

5. Conclusion

5.1. We will Comprehensively Improve the Software and Hardware Requirements of Virtual Reality Technology and Popularize Public Awareness
As a new technology in the new stage of digital era, virtual display technology has long-term development potential under the promotion of VR technology, artificial intelligence, hybrid reality and other new technologies. The system software can be improved in the following aspects to improve the technical acceptability. They are: 1. Beautifying the interface of human-computer interaction
technology; 2. Increasing the identification system of the interface; 3. Simplifying the operation of the system.

5.2. Strengthen the Students' Understanding and Application of Virtual Reality Technology

In campus, virtual reality technology is popularized and teachers and students' acceptance degree is strengthened. 1. The first part is to train the relevant teachers. Secondly, we should add the courses related to virtual reality technology in the curriculum system; thirdly, strengthen the application of virtual reality technology in the whole curriculum system of the major. 4.3 The combination of virtual reality technology and interior design promotes the development of emerging industries.

5.3. Strengthen the Application of Virtual Reality Technology for Interior Design Practitioners

Promote virtual reality technology, and carry out technical related training for interior design professionals. Strengthen the practitioners' use of virtual reality technology in their work, so that interior design workers can experience the sense of achievement and pleasure brought by virtual reality technology. Strengthen the interaction between practitioners and customers.

As a new training method in the new stage of digital era, virtual training has the potential of long-term development under the promotion of VR technology, artificial intelligence, hybrid reality and other new technologies. Virtual training will be full of the possibility of unlimited development, and the virtual training system will also be concerned. I believe that the virtual training system will bloom everywhere and be applied in all walks of life, and the future can be expected.

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