Research on Interior Design Method and Its Application Based on 3d Technology

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Abstract: in Recent Years, in the Process of Social and Economic Progress, People Are Increasingly Demanding Interior Space Design for Work and Life. in This Case, Traditional Drawings Such as Cad Plane Drawings and Hand-Drawn Drawings Have Been Unable to Fully Show the Needs of Consumers. This Paper Will Focus on the Central Topic of 3d Technology Interior Design Method and Application, Briefly Introduce the Related Concepts of 3d Technology and Interior Design, So That Readers Can Have a General Understanding of the Object of This Study. the Interior Design Often Determines the Overall Interior Finish, and the Paper Hand-Drawn Drawings Have Been Replaced by 3d Technology. This Paper Mainly Studies the Application of 3d Technology and Design Methods in Interior Design. I Hope This Article Can Bring More Substantial Help to More Industry Peers.

1. Introduction

With the continuous development of society, people's requirements for living environment are also constantly improving. Under such conditions, the interior design industry is also developing rapidly. Interior design is a diversified three-dimensional design, covering graphic design [1]. Interior design drawings are full of designers' good intentions and emotional devotion. In many cases, only hand-drawn drawings cannot show designers' planning and design of space. Interior design thinking is based on graphic thinking and depends on graphic expression. This is the silent language used by designers to express ideas and intrapersonal communication, and it is also an important medium for designers to communicate with users or construction personnel [2]. In the context of the continuous advancement of information technology, the methods adopted in interior design have also begun to change. The effective application of 3D technology has greatly improved the quality of interior design and can meet the needs of users. In this case, it is of great significance to actively strengthen the research on interior design methods based on 3D technology.

2. Introduction of 3d Technology

3D is also called virtual reality, which is abbreviated as VR technology in English. The object to be presented can be presented in a specific space through natural simulation [3]. Compared with traditional 2D technology, VR technology has the advantage of real experience. It can combine and communicate the scenery of virtual time with reality. VR technology has several features. 3D virtual reality refers to the method and technology of realizing natural simulation and realistic experience, which can create a harmonious human-computer interaction environment beyond the objective environment and beyond the objective time and space [4]. In the process of operation, 3D graphics enterprises have developed and used relevant production tools, such as Web3D, which can effectively virtualize reality and have very simple operation procedures. The GPU can accurately calculate the position of the virtual object, and the GPU has a strong rendering effect, which can transform the 2D graphics on the plane into a three-dimensional virtual scene through geometric

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processing [5]. Therefore, the realization of the effect of improving the design of indoor space by the three-dimensional architectural design software based on computer technology is the demand trend of modern people. The interior design of the building realizes the space requirement of interior design on the computer platform according to the requirements of people's life.

3. Advantages of 3d Technology in Interior Design

The United States is the birthplace of 3D technology. 3D technology is widely used in various fields with real visual effects and simple and convenient operation. In interior design, 3D technology can better meet customers' higher demand for interior space [6]. At present, XML, Java and VRML are important components of 3D technology. The technology was first created to meet the increasingly high requirements of the development of network media. Through the application of these technologies, the images and videos played can be more vivid and clear. At present, computer technology is widely used in the field of interior design to make renderings and realize architectural visualization [7]. It can better express the exquisite design that can't be displayed on the hand-drawn drawings through the stereoscopic picture form, which is more convenient for the designer to communicate and connect with the professional operation workers, which brings convenience to the interior design work. In the design stage of interior design, hand-drawn sketches are often used to express the concept of the plan, and the specific construction drawings are determined through continuous correction and improvement in the later stage of design. The construction drawing is generally an orthographic projection, including a plan view, a section view, an elevation view, a ceiling picture, and a partial detail picture. This design method can save design time and save the cost of model construction [8]. With the development of computer hardware, many interior design methods based on virtual reality technology have been proposed in recent years.

4. Interior Design Method Based on 3d Technology

4.1 Interior Integral Production

In modern interior decoration design, in addition to some hard decorative veneers such as ceiling, floor, wall treatment, people also pay attention to the details of the design, such as lighting, oil painting, cushions, curtains and other soft decoration choices. The application of ray tracing method in interior design can achieve better lighting treatment effect. The ray tracing method can output high realistic images. This method can combine many visual effects with a unified method, such as indirect illumination, transparent objects, soft shadows, glossy surface, sub-surface scattering. Interior design needs its space to meet the needs of people and interpersonal activities as the most basic core. It is also necessary to pay attention to the requirements of people's behavioral visual and psychological feelings. Different spaces give people different feelings. Different requirements should be considered for different people and different users. In addition, the application of computer-aided design software consists of two phases: modeling and visualization. It encourages people to observe the situation of the renderings more intuitively, which makes the gaps smaller in the space entity and 2D image imagination, and makes the defects in the construction graphics review process effectively compensated.

4.2 Making of Indoor Furniture

At the stage of decoration design, the model needs accurate size, shape and spatial location, and can automatically generate construction drawings to complete construction design. The design of soft decoration only depends on the visual attention model and does not need a completely accurate physical information model. In interior design, the study of ergonomics is very important. For example, in terms of furniture, furniture is an essential item in people's life. Through 3D virtual reality technology, designers can feel the height, length, size and width of furniture through computers. More consideration should be given to macro, micro and medium environment. For example, the construction and integration of the overall environmental atmosphere such as cultural

characteristics, styles and schools, and some ideas that should be considered in advance in the interior design process. In the process of using 3D technology, it is necessary to fully apply the sensors and hardware facilities to create virtual space for the display space. The spatial graphics constructed can make the viewers feel more realistic and experience the various links. Interaction. This stage can meet the requirements of material and texture, decorate the light, and then enhance the details of the surface of the object. Therefore, in summary, people's feelings can be obtained through 3D virtual technology, making interior design more ergonomic.

In modern interior decoration design, people pay much attention to the adoption of soft decoration such as lighting, hanging pictures, plants and curtains, besides the hard decoration such as hanging ceilings, laying floors and walls and making some wooden decorations and shapes. Requirements, shapes and functions in different decoration stages are not the same, as shown in Table 1.

Table 1 Decoration Stage

Stage	Present shape	Requirement	Function
Hard decoration stage	Cuboid, leg column	Accurate size	Parameterization and modification functions
Soft decoration stage	Complex and changeable	Simplify	Collect, organize and search
Visualization	Multiple materials	The rendering result is true	Get customer approval
Aesthetic appearance	Bonsai	Adjust the overall effect frame	Make the interior rich and beautiful.

From 3D modeling to the final product release process, the development of virtual reality interior design uses a variety of development tools and experiences a variety of production processes. Designers must base their design on human body before designing furniture. Including its size, style, shape and the scale of the furniture's surroundings and people's movement range during use. The meaning of virtualizing reality is that in the process of constructing a virtual environment, computers need to be utilized to facilitate the integration of different sensing devices in an environment, thus enabling the environment to be better felt by users and enabling natural interaction to be realized. Because of the tedious rendering process and the long time consumed by rendering, the traditional rendering process takes a lot of time and experience in the producer. In the process of modeling, a benchmark spatial model is first determined, and then scenario models are added one by one to ensure the independence of the model. By changing the location and size of nodes, each module in the room can be located one by one, and interactive functions can be designed according to the requirements. The goal of space three-dimensional modeling is to establish the corresponding virtual three-dimensional space model based on the actual three-dimensional numerical value. So as to achieve the perfect combination of indoor design and ergonomics.

5. Specific Application of 3d Technology in Interior Design

5.1 Key Points of 3d Design

Using VR Technology to Improve 3D Modeling Efficiency. The modeling work is actually relatively simple and not as complicated as imagined. To improve the modeling speed, unnecessary data can be ignored and only the positions of indoor walls, doors and windows can be considered. The model needs to be optimized on the premise of ensuring the authenticity of the model to facilitate the expansion of the model UV. At the same time, considering the overall performance of the whole system, the model is simplified. Immersion, authenticity, imagination and interaction are the basic characteristics of virtual reality. These characteristic signs enable the operator to truly enter an interactive three-dimensional virtual space initiated by a computer system, interact with it and communicate with it. In this process, electrical appliances, furniture and other contents need to be imported. Thirdly, visual design needs to add lighting, materials, etc. Finally, rich in aesthetics. To export the renderings very conveniently, and to lower the learning threshold of the software,

traditional modeling and rendering software is not so easy to use for material, texture and lighting setup functions. In order to input, save the data that needs to be modified every time to the modification record, to facilitate the modification operation, and build the indoor 3D model with the fastest speed. For the design part of the construction drawing, the construction drawing can be automatically generated by means of 3D data. Use diffuse maps to create normal and specular maps to make the material more realistic.

How to improve the speed of modeling is also one of the main factors in this paper. Therefore, compared with many powerful modeling software on the market, VR interior design modeling software needs careful design to provide the command set for fast input of common indoor component models besides providing the necessary basic modeling functions. The flow chart of modeling speed is shown in Figure 1.

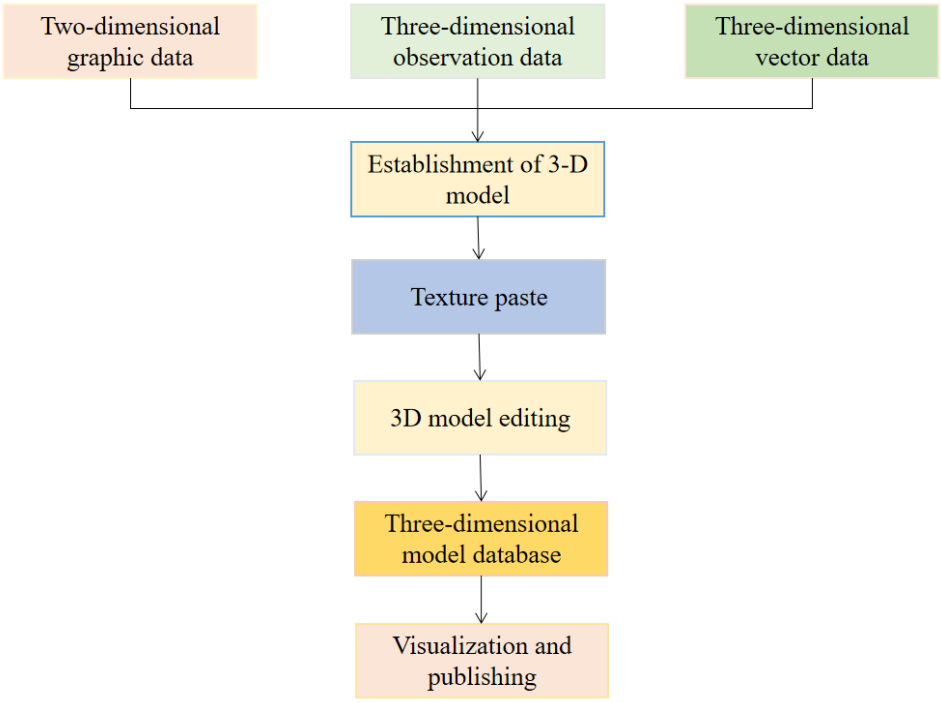

Fig.1 Modeling Speed Flow Chart

5.2 Interior Design of 3d Technology

In the interior design, it is divided into hard decoration and soft decoration. Hard decoration such as: indoor doors, windows, walls, main beams and so on. Soft decoration: furniture, electrical appliances, lighting, wallpaper, etc. are all soft decoration. The application of virtual reality needs to provide users with several different scenarios to meet the aesthetic needs of different users in interior design. In order to achieve more interactive functions in the scene, the design scene should have strong selectivity. 3D technology selection is different from traditional computer tools. 3D selection is dedicated to solving problems in the interior design field. It is not as powerful as some 3D software, but in the interior design field, it has added many elements suitable for interior design. Therefore, in the interior design, the advantages of 3D selection are more obvious. In interior design, 3D technology can be used to model interior soft and hard decorations. Visual design of interior floors, wallpapers, tiles, etc. can give priority to viewing the completion effect. In this way, customers can have priority to feel the effect. If there is any dissatisfaction, adjustments can be made to improve customer satisfaction. In order to achieve rich and beautiful effects, the overall adjustment of the later stage, the adjustment of materials and lights, and the making of scenes can not only achieve the effects we need, but also meet the needs of users to the greatest extent.

6. Conclusion

To sum up, 3D technology has the advantages of convenient operation and real effect. It can

enable users and non-professional construction personnel to better understand the design intent and design concept of interior designers, reduce the measurement time and drawing time of workers to some extent, and improve work efficiency. At this stage, in the process of active development in various fields, effective combination with information technology is needed to realize product and technology innovation and lay a good foundation for improving work quality and efficiency. Through the research and practice of this paper, a series of production techniques about interior design space are summarized, such as mapping technology, lighting technology, modeling technology, etc. It can effectively use ordinary computers to make and operate virtual reality, and it has made an exploratory attempt to promote the technology in the interior design industry in the future. With the continuous development of society, people's requirements for living environment are constantly improving, and the interior design industry is also developing rapidly. Interior design based on 3D technology can produce all-round stereo effect, improve the traditional method of interior design, achieve better interior design effect, and promote the further development of interior design industry.

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