Research on the Application of VR Technology in Traditional Building in Southeast Hubei

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Abstract. VR technology is widely used in modern design, involving interior design, outdoor design and other parts. VR technology mainly enables people to better feel the design effect. VR technology can combine the real Southeast Hubei traditional building environment with virtual things. Meanwhile, VR technology can make the plane drawings and 3D effect drawings more intuitive and clear display in people's field of vision, as long as users wear VR glasses, they can produce a feeling of immersive experience, which can be more effectively used in the design. This paper mainly expounds the application and influence of VR technology in the development of traditional buildings in Southeast Hubei, so that people can better understand VR technology and make real life better.

Keywords: Traditional architecture in Southeast Hubei; VR technology; Virtual reality.

1. The Application and Embodiment of VR Technology in the Buildings of Southeast Hubei

Southeast Hubei mainly means the Southeastern part of Hubei Province, which includes area under Ezhou, Huangshi, Xianning, southern Huanggang, and southern Wuhan's jurisdiction. The peculiarity of this area is mainly reflected in the following: first, the Southeast Hubei region is an important town for immigrants, because it is located at the junction of Hubei and Jiangxi (Jiujiang City). Its geography, folk custom and language are similar to those of Jiangxi. Secondly, the person in charge of Wu Chumei said that we have a lot of long-term local history and culture. Most importantly, in Hubei, it is seat of almost the oldest villages and houses, and is rich in traditional villages and houses in Hubei. In order to understand Hubei, it is necessary to understand the origin of Hubei, and the folk culture of Jiangxi cannot bypass this place. For example: Hong'an Village, the sky is blue, the water is clear, and the climate is suitable, "The green hill is surrounded by a small pond, a cottage and an ancestral hall, the courtyard passes through the driveway inside the stone gate and under the water wall under the eaves painting." Traditional villages in Southeast Hubei have created a typical local village style and formed an iconic psychological and emotional identity in Southeast Hubei.

1.1 Patio

Most of the buildings in the Southeast Hubei are mainly tribal residential buildings; the buildings' characteristics in the Southeast Hubei are patios in the houses, the courtyards in the Southeast Hubei are typical architectural forms, the buildings in Southeast Hubei are airtight, so the residential areas are generally built with patios to help lighting and ventilation, for example, Hanrunli, a Lifen building group in Wuhan, there is patio inside every household, and some folk houses in Hong'an County, Huanggang also have patios, the reason may be that Southeast Hubei belongs to subtropical climate, summer is hot and wet, winter is cold and dry in, and four seasons are obvious.

1.2 Pond

The settlement in Southeast Hubei is also very important for the setting of ponds, almost every residential tribe will have a pond, which is convenient for residents to take water and use.

1.3 Temple

Almost all the settlements in Southeast Hubei have a temple, which may be due to the influence of religious culture, for example, the temple in Hongan County, Huanggang, The design and establishment of the temple must follow two fundamental principles: one is tradition; the other is to promote Buddhism. First of all, we must inherit the tradition, the famous birthplace should maintain the basic system restoration, in architecture, landscape planning, painting and other plastic statues, and the ancient temples with cultural value should be protected. Ancient and innovative, clean and exquisite Buddhist temple atmosphere, modern buildings, commercial facilities should be placed outside. Tourist temples should strive to maintain order, forbid noisy men and women, drink and smoke, play music and keep solemn and clean. In addition, it is necessary to balance the pattern of traditional temples and add necessary new facilities according to the needs of red law; the needs of the new era of temple preaching can be met, and four centers are set.

2. Advantages of VR Technology in the Traditional Architectural Design in Southeast Hubei

VR-virtual reality, uses computer simulation generate three-dimensional virtual world, which provides users with the simulation of vision, hearing, touch and other senses, so that users can immersive observe things in three-dimensional space in time. VR can use the existing real environment provide users with all-round visual effects: users in the real world and computer-generated virtual scene integrate. When the real scene moves, the virtual object will change. If they really feel the existence of virtual objects in the real scene, ideally, virtual objects can also naturally make users and real objects ugly. The difficulty of developing the augmented reality system is how to determine the position of the camera relative to the real world in real time and accurately, and how to integrate it seamlessly with the virtual scene of the real world.

VR technology is an important direction of simulation technology, which is an integration of simulation technology, computer graphics human-machine interface technology, multimedia technology, sensor technology, network technology and other technologies; and it is a challenging cross technology frontier discipline and research field. Virtual reality technology mainly includes simulation environment, perception, natural skills and sensing equipment, etc.

Virtual reality technology is rarely used in the construction industry, its main reason is the general large-scale construction projects, VR technology level is relatively high, and it is difficult for ordinary people to complete the whole project or customers. At present, VR technology is rarely used in the construction industry. Only 3D effects of VR smart home placement and building type are displayed. However, in these studies, there is still great hope for the future development of VR technology in the construction industry.

For the traditional architectural design in Southeast Hubei, the traditional conversion method of architectural design often changes from two-dimensional graphics to three-dimensional thinking. Because the two-dimensional or three-dimensional graphic models only reflect part of the information architecture, according to the designers' introduction, there is no comprehensive design object at present. Tunnel vision and comprehensive thinking ability often cover up some design defects. So that architects can register the 3D model of architectural design in the real world as the architectural design model in the real world.

Secondly, in the aspect of traditional building construction management in Southeast Hubei, because VR contents are loaded on the construction site, the on-site personnel can freely extract data and high quality of other professional activities required by the aircraft.

VR can reduce the misunderstanding caused by the distortion and serious loss of the construction organization drawing, reduces the repeated reading of the time chart by the construction personnel, strengthens the training of the on-site personnel, and even emphasizes the information node under the construction load, which is conducive to importance of the safety management of the website.

The traditional architectural design in Southeast Hubei needs more and more cooperation. Unlike face-to-face or video conferencing, people involved in the project can meet in a virtual environment. In fact, they can meet and communicate with each other in the building or scene they are designing.

Many problems and errors in traditional architectural design projects are caused by poor communication. When partners are able to present, interpret, and change designs in a shared space, misunderstandings and errors are less likely to occur. VR also provides new methods to visualize and simulate building systems, phenomena and functions.

The traditional architectural drawings or rendering effect drawing in Southeast Hubei cannot fully represent the three-dimensional and spatial nature of buildings. Designers and builders always create physical sand table models to help simulate the feeling or physical aspects of the real environment or buildings. Making physical sand table models is time-consuming and often costly. Most of them are models with equal scale reduction, and their materials or colors do not match the real ones very well. 3D printing can make model building faster and cheaper, but the actual size of the model cannot be made.

We can experience virtual reality can when playing advanced computer games. It replaces the real scene with the scene generated by computer generated. Best of all, it make people immersive, but it requires high-quality helmet masks, such as Oculus Rift and HTC Vive, as well as roaming devices like Virtuix Omni.

3. The Influence of VR Technology on the Development of Traditional Buildings in Southeast Hubei

The development and application of VR technology become increasingly wide in modern society; the traditional buildings in Southeast Hubei mainly aim at practicality, while the modern designs mainly aim at development of aesthetics, therefore, VR technology can help designers improve the design efficiency and promote the design development more conveniently. VR technology can make designers more intuitively experience effect drawing produced by 3D, when the experiencer wears VR glasses, they will be placed in the whole project, and can freely "enter" and "climb" in the virtual scene, feel the project landscape under the alternation of day and night, check every part of the project structure, and really feel the danger in the project construction.

Compared with traditional safety training, VR technology can stimulate workers' interest in safety education, and workers' perceptual awareness for safety accidents will be enhanced; moreover, VR technology has the advantages of small area, short experience time, unlimited simulation of unsafe scenes, and can be reused in different projects; the experiencers can also learn detailed nodes and excellent practices to obtain relevant data and information, moreover, it can further optimize the plan and improve the quality; moreover, it can avoid the waste of materials and labor, which conforms to the idea of green construction.

Construction is a kind of dangerous work in the development of traditional architectural design in Southeast Hubei, as far as the workers who work in the post are concerned, safety is very important. According to OSHA, 6.5 million people work on the construction site every day, and the fatal accident rate of the construction industry is higher than any other one. Therefore, safe and effective training is very important. The more workers practice in a controlled environment, the better they will work on site. Moreover, it is very difficult to create effective simulation in the physical world, but it is very convenient in VR.

Workers can practice installing and removing ladders, operating various construction tools, and other potentially dangerous exercises, but accidents can happen quickly and accidentally at real construction sites. There is only so much we can do, through modeling and continuous rehearsal; workers can cope with any emergency that may occur.

Through virtual reality technology, any simulation can be achieved. Advanced computer simulation can create an amazing and realistic scene environment; when cooperating with controllers like leap touch, employees can have a real sense of operating real power tools and other devices. In addition, VR simulation can present decision-making scenarios and unexpected

situations that are difficult or impossible to represent or reproduce before, such as what to do when a ladder or scaffold collapses. Building architecture is a long and expensive process, before breaking the ground; all possible variables should be considered. The change order in the construction process will cause various difficulties to finance, management and logistics. The blueprint may need to be resubmitted and re-approved by the city or other government departments. Material requirements may change, and even small design changes may have unforeseen effects on other parts of the construction.

Moreover, sometimes it is necessary to changes, and sometimes it's impossible to track each variable at all. Once the building begins to form shape, problems and defects that are not visible in the blueprint may gradually appear. This is a difficult problem to be solved, which has puzzled both builders and customers for many years.

Virtual reality technology provides a creative solution. By using virtual reality system, blueprints can be presented before workers set foot on the work site. Customers and architects can see the buildings to be completed from any angle, in real scale, or even roam around to find hidden problems or defects. One of the most exciting applications of new VR technology in construction is the possibility brought by augmented reality technology. Unlike virtual reality, AR allows users to maintain comprehensive visual understanding FOR the real world, but superimposes additional information around users.

With the large-scale deployment of hardware, VR gradually becomes more economical and feasible, and the user interface becomes more and more convenient, VR can change the construction ways of structure. During the working period, the staff can wear VR glasses like DAQRI smart helmet to show the construction plan synchronously. Materials and fixtures can be accurately aligned quickly and easily without having to consult paper documents.

More importantly, workers can give situational cues about the location of other workers and heavy equipment. Problems such as fast moving objects, unstable platforms or skidding equipment, can be immediately sent directly to the helmets of nearby workers, so that they can correct these problems before safety hazards happen.

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