Application of Virtual Reality Technology in Project Management

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Abstract—This paper comprehensively analyzes the interactivity, immersion and perception of virtual reality technology from the perspective of project management. Virtual reality technology plays an important role in safety management, quality control and progress control of project management. Therefore, this paper makes a comprehensive analysis from the progress, investment and safety of virtual reality technology and traditional project management. Virtual reality technology uses computers to interact with diversified information to form a three-dimensional dynamic scene and system simulation with entity behavior, so that users can deeply experience the virtual environment. The project management uses the project virtual world and virtual model created by virtual reality technology, and uses virtual reality auxiliary equipment such as virtual glasses, head mounted display and three-dimensional model display, so that managers can actually feel the effect and actual scene of project construction and control the progress of project construction in real time.

Keywords-Virtual reality technology; Project management;3D stereo model; Data information analysis

1 INTRODUCTION

With the continuous expansion of engineering construction projects in China, engineering management industry has put forward higher requirements for the construction accuracy of engineering construction. Virtual reality technology as an excellent high-tech, has a strong collective and systematic. Based on this, this paper mainly studies the virtual reality technology in the project management, using the virtual scene and simulation technology to establish the engineering model, in order to promote the overall development of the project management level. This paper mainly analyzes the virtual reality technology model design and virtual reality technology and engineering construction management.[1]

2 MODEL DESIGN OF VIRTUAL REALITY TECHNOLOGY IN ENGINEERING MANAGEMENT

Virtual reality technology simulates the surrounding scene environment, composition structure,

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mechanical equipment and three-dimensional model through simulation images to form a systematic simulation environment system, which has dynamic characteristics during engineering work design and forms a visual environment design of human-computer interaction [2]. Because of the rapid development of market economy, the market competition is becoming more and more fierce [3]. Therefore, in order to better occupy a favorable market position, we need to use virtual reality technology to help the feasibility of engineering projects be effectively guaranteed [4]. In the traditional project management, data sampling and sampling survey are generally used for investigation and analysis, and the correctness of the data results is difficult to guarantee [5].

The project management carries out data analysis and demonstration on the address, process equipment and traffic environment impact of the construction object, and carries out practical operation on the feasibility of the project [6]. At the same time, it is also to further ensure that it can provide a solid theoretical and practical basis for project investment decision-making [7].The project management operation process is to draw the system according to the construction operation, which is suitable for the general project management work, as shown in Figure 1.

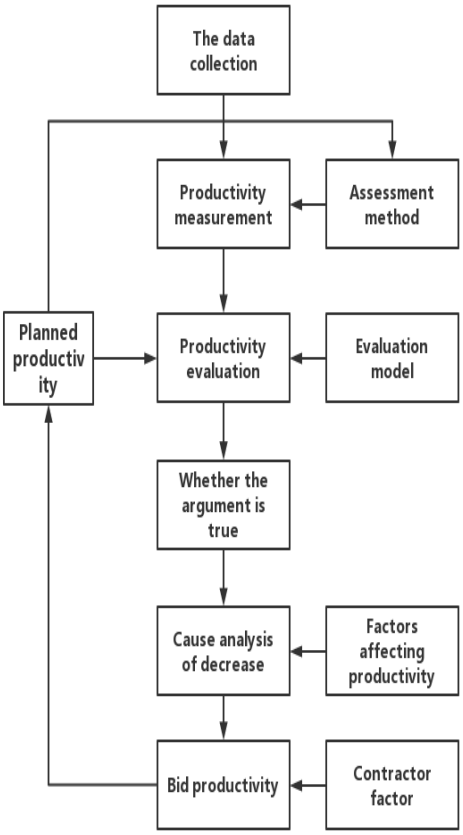

Figure 1. Project management operation process

To convert the feasible project management scheme into an accurate simulation model, it is necessary to debug the parameters to the appropriate value in the process of model establishment, and obtain the simulation results of virtual reality technology in the appropriate time. In this way, the survey results can not only be further accurate, but also help the smooth progress and development of the next project construction work [8]. The use of virtual reality technology can provide managers with a lot of operation space, so that managers can draw accurate conclusions about the engineering results [9]. For the real-time visualization of the three-dimensional model of the project, the project management enterprise establishes the three-dimensional model of the project through the virtual simulation technology, and uses the virtual reality technology to investigate and analyze the movement behavior and residential habits of users. In the simulation model, users move freely in the simulation building, choose their own scene orientation at will, and then use the virtual reality model to eliminate and check the design problems of the preset path monitoring device [10]. This method can not only quickly solve the faults caused by various factors in project management, but also provide technical basis for project management and prove the accuracy of project management.

3 VIRTUAL REALITY TECHNOLOGY AND ENGINEERING CONSTRUCTION MANAGEMENT

3.1 Construction of project management model based on Virtual Reality Technology

The information that construction enterprises use drawings to present the construction progress and activities to customers is not intuitive. The general construction drawings are difficult to imagine the specific construction results, do not give people a real feeling, and the preservation of drawings is extremely fragile. Once they are wet, torn and burned by water, they are easy to cause losses [11]. At the same time, the drawings can not accurately give customers three-dimensional experience, and the characteristics and structures of many construction projects can not be fully displayed to customers. Using virtual reality technology, customers don't have to spend time checking the progress and dynamics of the project at the construction site. Relevant enterprises use the three-dimensional model established by virtual reality technology to build a virtual environment consistent with the project model, ranging from community greening construction to room layout, so that customers can feel the real living environment, Enhance customers' sense of reality. The application of virtual reality technology not only helps customers, but also solves a lot of financial and material resources for engineering development [12]. What is more important is to meet the diversified needs of customers and enable customers to enjoy high-quality services in the selection process. If consumers want to invest or buy, they can also use virtual reality technology. No matter when and where customers can be realized immediately, they can be realized at will only by entering the engineering building model with the help of virtual reality equipment. In the marketing process, many enterprises began to widely use virtual reality technology to fully display the physical construction projects in front of customers with a full range of engineering construction and engineering VR roaming experience[13]. While experiencing the engineering structure, customers also understand the sense of science and technology of virtual reality technology. Engineering management realizes the further development and improvement of the industry through the scientific and technological innovation of virtual reality technology. The project management application of

virtual reality technology is shown in Figure 2.

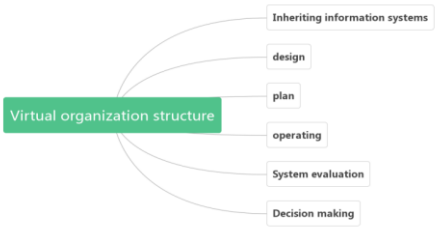

Figure 2. Virtual reality technology engineering management application

3.2 Integration design of virtual reality technology and engineering construction

As the engineering construction is a large-scale dynamic system with high difficulty coefficient and high complexity, the engineering construction system mainly includes engineering formwork, engineering concrete pouring, reinforcement mixing, etc [14]. At the same time, the construction site is not fixed, the division of labor and coordination of construction personnel, equipment transportation, raw material procurement, etc., bring many uncertain factors and complexity to the construction management.

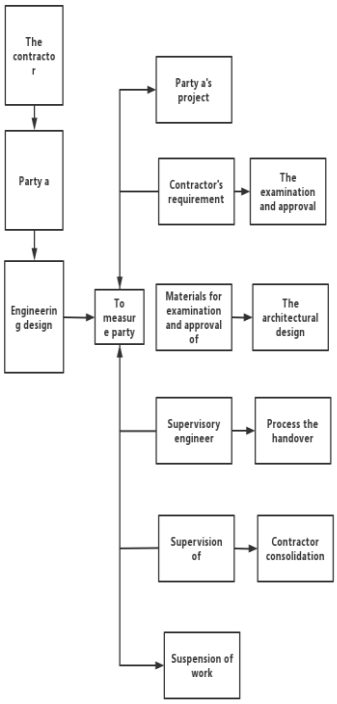

Figure 3. Application process of virtual reality technology in engineering management system

In the process of project construction, many small details are easy to be ignored. If virtual reality technology is used, the model of the whole project construction process can be virtualized, so that any problem can be reflected in the virtual project construction model, so as to facilitate the construction personnel to change the construction scheme in time. For example, in the traditional project schedule, the installation and design of embedded parts are ignored. It is not necessary to forget to prepare the installation of embedded parts in the later equipment installation plan. However, once the virtual reality technology equipment is installed, it will be found that it cannot be installed without embedded parts, so as to rearrange the plan to prevent the construction progress from being delayed or delayed due to missing items in the plan[15]. Virtual reality technology is used in all processes of the whole project construction process, regardless of whether the relationship between time and space conflicts or not. With the project construction in different time periods, the labor, construction facilities, construction materials and other problems can be displayed in detail[16]. Therefore, the project management adopts virtual reality technology to prepare the project schedule, which is more in line with the actual situation of project construction.

4 CONCLUSION

Virtual reality technology is a comprehensive technology with a variety of computer technology, interactive technology, big data technology and strong practicability and application. Virtual reality technology has been deeply developed in different fields. Virtual reality technology can greatly break the limitations of time and space, conduct systematic simulation and demonstration in the virtual environment, and let users explore the virtual scene and space-time in virtual reality technology. The application of virtual reality technology in engineering management can not only promote the model construction of engineering system, but also calculate the actual work progress of the current project by using computer algorithm on the basis of real-time simulation of engineering construction. The use of virtual reality technology not only improves the construction quality of project management, but also improves the quality of project management, and meets the development requirements of the project management industry for the integration and innovation of modern virtual reality technology.

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