

# The Role of Building 3D Animation Resources and Interactive Design in Virtual Environments

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**Abstract:** Virtual environment refers to a teaching mode that combines virtual reality technology with teaching. By utilizing virtual learning environments to break through the limitations of time and space, students can experience immersive learning to a certain extent. The visual, realistic, reasonable, and efficient interactive design of 3D animation production has stimulated students' learning interest, cultivated their self-learning ability, and enhanced their learning efficiency. In a virtual environment, combining interactive design with existing learning resources can promote higher-level conscious research and enhance cognitive effectiveness.

**Keywords:** digital learning; immersive learning; virtual environment construction

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## Introduction

In virtual environments, cognitive environments are more realistic. By simulating real scenes and focusing on interactive design, we explore the unique foundational resources of 3D animation. Through making full use of existing materials, the animations become more realistic, creative, and artistic, thereby enhancing students' enthusiasm for understanding animation works. In the context of the New Curriculum Reform, it is necessary to deeply analyze the internal mechanism of interaction design and use existing knowledge to regulate interaction design. On this basis, we can summarize the animation generation process and determine the key points of the design route, in order to create more creative 3D animations and make interactive design more interesting.

## 1. Overview of virtual environment and 3D animation resources

### 1.1 Virtual environment

Virtual environment refers to the integration of people's real understanding of the environment with the virtual environment, in a virtual way to perceive the surrounding environment and improve its realism. To achieve such a realistic virtual scene, the key lies in grasping its design process. With the continuous innovation of current technological level, the realism of virtual scenes is becoming stronger and stronger, which is very valuable for research in product development, interactive design, and other aspects.

### 1.2 3D animation resources

3D animation is a three-dimensional spatial structure created by adding directions on a two-dimensional plane. In mathematics classes, we often come into contact with three-dimensional graphics, and with the continuous development of society, many industries have started to use three-dimensional graphics, including animated films that children love. 3D animation is helpful for students understanding images. In daily life, people often encounter designs related to three-dimensional space, but many people do not know how they are constructed. The following will explain the production methods of 3D animation and its applications in daily life.

One is to understand the definition of three-dimensional. From a mathematical perspective, three-dimensional means adding a direction vector in a two-dimensional plane. There are many three-dimensional questions in mathematics teaching, especially in geometry problems. However, in traditional drawing methods, some graphics are difficult to draw and require the use of computers for drawing.

The second is proficient computer skills. It is easy for professionals to render 3D graphics with a computer, but it is difficult for those who do not understand 3D graphics. Therefore, in order to create 3D animation, it is necessary to know more about the application of computer design programs in 3D animation design in advance.

The third is sufficient spatial imagination. Recognizing three-dimensional is a process of opening thinking, and full spatial imagination is the key to creating perfect three-dimensional animations. Three-dimensional animation, also known as 3D animation, requires a considerable level of technical proficiency. Advanced 3D animation simulation technology enables the replacement of solids. It has been widely applied in various fields such as education, medical care, military, film and television media, entertainment, etc. due to its characteristics of authenticity, accuracy, strong recognition ability, strong operability, and strong adaptability.

## **2. The correlation between virtual environment and 3D animation**

### **2.1 Creating models and animations**

Animation design is a well-known technique, where the characters or environments in each animation work are very close to the real world, and people often have a visual illusion. Animation designers will first outline a picture in their minds, and then use 3D technology to depict a picture that suits their outline. Animation design mainly studies human body sketching based on virtual scenes, objectively describes its appearance in the virtual environment, and makes the structure of the entire system clearer and easier to understand. Secondly, one can adjust the virtual environment and animation according to their own preferences, including adjusting colors, lighting, etc., to add pleasing visual effects, clearly display the ideas to be expressed in the virtual scene to create a harmonious atmosphere, attract more attention, and improve the attention of viewers.

### **2.2 Adding more features for interactive classes**

Interaction design includes filtering software and programming language calls. The interactive interface can be customized through the interconnection between three-dimensional animations established in a computer virtual environment. The interactive interface is quite complex, containing all the application functions and instructions executed behind the computer. In this way, a fast and visual interaction process can be created, and themes and virtual scenes can interact with each other. Under the interactive architecture, a lot of creative fun can be added, creating a relaxed atmosphere. The 3D mode can be changed arbitrarily according to the settings of the computer program until a satisfactory 3D animation is produced. Due to interaction with the surrounding environment and various available information, the process of operation becomes more interesting. Therefore, more and more people are starting to try and explore new technologies.

## **3. Steps for building a virtual environment**

### **3.1. Conceptualizing a virtual environment**

Firstly, atoms are very small particles that cannot be seen with the naked eye, so each atom has its own space. Every creator's imagination is different, so their understanding of the world is also different. They only know that atoms are very small substance. In this case, creators can imagine how atoms are understood more clearly and simply in a virtual scene. Creators can outline virtual scenes in their minds, which are closely linked to the resources that creators can utilize. In the creator's mind, design can be applied to a virtual scene to construct a virtual environment.

### **3.2 Computer design virtual environment**

Due to the varying levels of computer technology among individuals, the virtual environment envisioned in their minds can be set up by computer programs. So, in a virtual design environment, the use of computer programs will be different, which also requires students to learn more geometry in math classes. In this way, it can not only elevate the knowledge learned by students themselves, but also enable them to apply their knowledge at a deeper level.

### **3.3 Vivid and realistic virtual environment**

The design goal of a virtual environment is to standardize and simplify the knowledge points that is abstract and difficult to understand. The design of virtual environments focuses on realism. Only in this way can knowledge that is theoretically difficult to express be made easy to understand in a virtual context, thereby greatly stimulating the creative enthusiasm of creators. Through the research of this project, more people can be encouraged to participate in the design of computer virtual environments, thereby promoting the rapid development of China's computer industry.

#### **4. Refinement process of interaction design**

In a virtual environment, in order to improve students' cognitive abilities and highlight their teaching characteristics, it is necessary to follow certain interaction rules. Using interactive design, with a particular emphasis on adding artistic features and building interactive bridges. The intuitive effects of visualization are closely related to changes in cognitive interests and emotions, and can affect the cognitive effects that can be achieved. Its hidden artistic characteristics cannot be ignored.

When establishing a physical model, attention needs to be focused on the following aspects: To avoid excessive individual simulation, it is necessary to increase the analysis of matching. This method can help students focus their attention on analysis without being interrupted. We also need to screen existing relevant cases, review and handle them appropriately. In this way, the chosen solution becomes more typical, concise, and easily accepted by students. In terms of design, a simple appearance is more impressive and it can also reduce manufacturing costs at the same time.

The selection of materials and the adjustment of lighting both need to be noted: materials refer to the attraction of the model itself and the basic elements it contains. The lighting is focused on the internal design, fixed on the model to add a beautiful atmosphere to the replication. Setting up this lighting method can evoke strong emotional resonance and also convey the essence of the course. 3D animation requires harmonious and good lighting, and these two aspects should be closely combined to create a perspective atmosphere. It can create a truly profound sense of depth.

#### **5. Conclusion**

In summary, the advantages of virtual environments make up for the shortcomings of traditional teaching methods. Through interactive teaching design, interactive bridges are added in the classroom to overcome cognitive barriers among students. 3D animation highlights three-dimensional images and can simulate the process of some changes. The interaction within three-dimensional buildings expands the original cognitive space, enhances the level of observation, and facilitates students' understanding of multiple points. In terms of the current situation, interaction design is not perfect and requires more in-depth exploration and analysis in order to provide better support for daily teaching.

#### **References**

- [1] Jia Hu. Building 3D Animation Resources and Interaction Design in Virtual Environment [J]. Art Hundred. 2017; 33 (05): 254-255
- [2] Chengyu Yan. Research on Building 3D Animation Resources and Interaction Design in Virtual Learning Environment [J]. Art Technology. 2015; 28 (11): 278
- [3] Lili Liu, Yutao Ling, Yanfeng Wang. Research on Building 3D Animation Resources and Interaction Design in Virtual Learning Environment [J]. China Electronic Education. 2014; (02): 128.