# Application of Virtual Reality Technology in 3D Animation Teaching

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**Abstract:** In order to improve the quality of animation professional 3D teaching, according to the characteristics of animation professional, combined with VR (virtual reality) technology, VR experimental content, VR experimental equipment support, VR teaching evaluation, VR experimental technical support. In the realistic technology of 3D animation experiment teaching, through the corresponding experimental data analysis, the VR technology is applied to the teaching quality of 3D animation experiment teaching, and the teaching effect and student enthusiasm are significantly improved.

## 1. Introduction

The virtual experiment was proposed by Wil-liam Wolf, a professor at the University of Virginia in 1989. In these 28 years, the characteristics of virtual experiments and unparalleled traditional experiments have attracted the attention of scholars[1]. Virtual animation experiment refers to the application of VR technology to 3D animation experiments to form virtual 3D animation experiments, allowing students to learn and explore in a virtual environment[2]. VR technology is currently heating up at home and abroad because it combines multiple technologies to create a three-dimensional realistic virtual environment. To enter the virtual environment, students can wear some external equipment, such as wearing special helmets, handles, etc., to enter the virtual environment to experience and operate virtual projects. In the traditional 3D animation experiment teaching, teachers usually teach and demonstrate according to the teaching plan and syllabus. Students are validated and perceived through an understanding of the knowledge points and the teacher presentation process[3]. Traditional teaching is for students' innovative ability. These words are lacking. Because the student's operation is just a verification test.

Because in a virtual environment, students can use their imagination to verify various experiments, and can independently innovate and build new experimental projects. Based on the actual situation of the college, this paper proposes to apply VR technology to 3D animation experiment teaching, and then carry out simulation experiments, which shows that the teaching method has a good teaching effect.

## 2. Virtual Reality Technology

### 2.1. The concept of virtual reality technology

With regard to the concept of "virtual reality technology", we can understand it as a new technology in the field of computers, in addition to electronics, imaging and computing technology, but also multimedia and analog technology. Through this technology, people can successfully build computer simulation systems and successfully experience the virtual world[4]. The simulation effect of this world is very significant. It is not difficult to see that this is a very challenging interaction technique that is widely used in scientific research. Not only that, but its applications even extend to many areas, such as medicine, film and television, military and education. The main components of this technology are: computer processing high-performance technology, physical materialization, virtual material realization[5]. The so-called physical illusion is actually mapping a multidimensional information space in the real world. The key technologies used in this technology mainly include the following aspects: first, sound localization technology; second, model construction technology; third, visual and spatial tracking technology. Making full use of the above

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technologies can enhance the authenticity of the virtual world to a certain extent, and provide great convenience for the user's related operations and monitoring.

### 2.2. Characteristics of virtual reality technology

With regard to the characteristics of virtual reality technology, we can summarize as follows:

(1) Immersive features. With this technology, any ordinary computer can realize the effective construction of the virtual world. The user can get the same feeling as the real world, and the feeling of "immersion" is naturally generated. It's easy to immerse yourself.

(2) Its human-computer interaction characteristics are more significant. Users are free to manipulate virtual objects in the virtual world and get some feedback.

(3) Very imaginative features. This technology not only can effectively simulate the real world by building a virtual environment, but also create a large enough imagination space and environment for users.

(4) It has certain multi-perceptual characteristics. Under normal circumstances, users can get visual and auditory experience through the computer smoothly, but virtual reality technology can make the user feel the touch, even the taste, and its multi-sensory characteristics are remarkable[6].

## 3. The Teaching Significance of 3D Animation Design Combined with Virtual Reality Technology

### 3.1. Built a 3D animation virtual environment

The combination of 3D animation design and virtual reality technology provides unlimited possibilities for teaching modernization, bringing new breakthroughs and experiences to the 3D animation teaching environment[7]. 1) The combination of 3D animation design and virtual technology can support interactive design in 3D virtual environment, and use purely technical anthropomorphic method to express the motion state of real objects, making the teaching process full of interactive fun and vitality; 2) can build a The surreal virtual space environment provides more vivid and realistic teaching tools for teaching, thus naturally bringing users into multi-dimensional, intuitive and dynamic real life, bringing students vivid teaching scenes, and new visual experience evokes students. The rich imagination of learning; 3) In the field of animation teaching, the combination of 3D animation design and virtual reality technology can provide powerful technical support for teaching, so as to make more effective use of teaching resources and existing images. Convert traditional 2D animated images to dynamic 3D visual effects.

### 3.2. Strengthened interaction and immersion in teaching

"Immersiveness" is one of the typical features of 3D animation design combined with virtual reality technology. Interaction refers to the "dialogue" between students and the teaching atmosphere, so that students are completely immersed in the construction of virtual technology[8]. Enter the teaching situation. Through the combination of 3D animation design and virtual reality technology, the real teaching model in the 3D animation environment can be visually reconstructed in the classroom teaching. The virtual scene realized by the technical structure can utilize the realistic object image to let people put in the virtual scene, thereby breaking through the time and space constraints in the teaching, restoring the real feelings of the students in teaching, and realizing the ideal teaching. Effects and sensory experience. There is no doubt that the combination of 3D animation design and virtual reality technology can create virtual scenes that are close to reality, enhancing the interactive and immersive experience in teaching.

### 3.3. Adapted to the needs of social development

Virtual reality technology is closely related to 3D animation design. This form of animation using virtual reality technology has been widely used in urban construction, industrial products and cultural industries[9]. Today, with the rapid development of the economy and society, people's demands for quality of life and various consumer goods are getting higher and higher. Combining 3D animation design with virtual reality technology and applying it to teaching research can not

only promote the development of related industries and technologies. Continuous innovation and development can also cultivate a group of innovative talents with high technology and knowledge reserves for the society, which is conducive to the application of virtual reality and future development.

## 4. Analysis of Experimental Data

Whether VR technology is suitable for 3D animation teaching, whether the teaching effect is improved, and verified and analyzed by corresponding data statistics. The data results are shown in Tables 1 and 2. In the article, the experimental object is 16 levels of four animation professional classes, 16 levels of animation, 25 classes per class, 1302 virtual labs. The experimental data comes from the same experimental project - 3D modeling research, testing students under two teaching methods (traditional 3D animation experiment teaching, VR technology applied to 3D animation experiment teaching), students are not in the classroom, the missing class data reflects Students' positive attitude towards different teaching methods. At the same time, students also operate through students. Comparing the level of interest in the experiment - When many students are bored in the classroom, even if the teacher's course is very exciting, some students will inevitably play mobile phones and games in the classroom. With the following data, we can easily find the answer. Applying VR technology to 3D animation experiment teaching is not only feasible, but also experimental and practical. Quality has improved.

Table 1 Two types of teaching methods for students absent from school

| Experimental class | The number of students missing in traditional 3D animation experiment teaching | VR technology applied to 3D animation experiment teaching missing class |
|---|---|---|
| Animation class 1 | 5 | 0 |
| Animation class 2 | 3 | 0 |
| Animation class 3 | 4 | 0 |
| Animation class 4 | 6 | 0 |

Table 2 Student participation in two teaching methods

| Experimental class | Traditional 3D animation experiment teaching student participation | VR technology applied to 3D animation experiment teaching student participation |
|---|---|---|
| Animation class 1 | 20 | 25 |
| Animation class 2 | 19 | 25 |
| Animation class 3 | 21 | 25 |
| Animation class 4 | 22 | 25 |

## 5. Application Strategy of Virtual Reality Technology in 3D Animation Teaching

### 5.1. Technical construction of teaching equipment

Combining 3D animation design with virtual reality technology, the construction of teaching scenes is based on related computer technology equipment, including PC development environment and 3D scene editing technology[10]. 1) The configuration of the PC allows the student to interact with the objects in the virtual environment through the computer terminal, thereby increasing the operability of the teaching and the teaching effect of the image resources. The technical construction of such computer equipment can reflect the abstract teaching curriculum, reduce the display cost of many teaching experiments or links, and improve the convenience and efficiency of classroom learning[11]. 2) The construction of virtual reality technology also needs the support of 3D scene editing technology. This technology can enhance the interactive experience of the teaching environment, make the 3D scene and virtual reality technology better combined, and give

full play to the subjective initiative of students in teaching. Learn to participate and finally build a simulation of a three-dimensional interactive classroom.

### 5.2. Subjective construction of instructional design

In the teaching environment combining 3D animation design and virtual reality technology, we must also pay attention to the purpose, objectivity and feedback in teaching design, with the "teaching" and "learning" two-way teaching mode. 1) Firmly grasp the teaching objectives. In the process of constructing the combination of 3D animation and virtual reality technology, it is necessary to clearly and accurately target the teaching according to the syllabus, and guide students to participate in learning according to the specific situation. Student's conditions. In the middle, it is reasonable to apply teaching resources to teaching tasks; 2) Adhere to the objectivity of teaching, not only to objectively treat students' cognitive level, teaching equipment and teaching conditions, but also to realize the virtualization of teaching content as much as possible. . The transformation of real technology makes the teaching content reasonable and orderly[12]. 3) Throughout the teaching process, it is necessary to pay attention to timely feedback and evaluation of students' learning, to ensure that students can participate in teaching, to understand the absorption of relevant knowledge, and to improve the quality and effectiveness of teaching.

### 5.3. Student-centered teaching ideas

To achieve open learning in teaching, a student-centered teaching system must be established. 1) Pay full attention to the introduction process before teaching. Although 3D animation design and virtual reality technology are very convenient, they also need to prepare for the classroom; 2) It is equally important to teach the teacher's "teaching" and the student's "learning". The position is guided by the teacher, student-led, giving full play to the subjective initiative of the students, breaking the traditional teaching routine of all staff; 3) To accurately understand the teaching situation of teachers, the main responsibility of teachers is to design teaching resources and guide learning. Readers should use their own learning methods to gain their own knowledge and knowledge. Teachers should not interfere too much with the learning process. Students should be the main body to develop students' creative thinking and improve their ability to deal with problems.

## 6. Conclusion

In summary, based on the combination of 3D animation technology and virtual reality technology, we should fully innovate traditional teaching methods, strengthen the compatibility of students with 3D animation design and virtual reality technology and equipment, and further promote the construction of teaching equipment technology and subjective Construct teaching design and student-centered teaching concepts to achieve reasonable arrangements for teaching courses. In addition, as an application innovation of emerging technologies, the application of 3D animation technology and virtual reality technology in teaching needs to be deepened. Only by cultivating students' interest in learning and guiding students' needs can students' self-learning ability be improved.

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