# On the Application of Virtual Reality in Animation Teaching

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**Abstract:** The article aims to offer a description of the characteristics of virtual reality and technique itself. Meanwhile, we analyze some main problems found during animation teaching and look into the feasibility of virtual reality being applied to animation teaching. We then put effort to demonstrate the effect virtual reality may have over the teaching process and detailed strategies to be practiced when applying virtual reality in animation teaching.

## 1. Introduction

Virtual reality technology is able to enhance people's experience of perceiving things in a natural, complete and three-dimensional way and strengthen people's five senses. Introducing this technology into animation teaching can create a teaching environment of vividness for students and an experience of sensory in colorful ways, so as to help students study well.

## 2. Virtual Reality and its Characteristics

### 2.1 Virtual Reality

Virtual reality technology is a simulated environment built based on various technologies such as simulation technology, Internet, and sensing technology. The virtual environment it offers gives people feeling that’s almost reality. Since the 1980s, virtual reality technology has developed a trend of diversification and becoming multi-dimensional, while its connotation has been largely expanded. Now, virtual reality technology not only refers to a series of high technology equipment such as helmets, but also includes all the other relevant technologies and methods with natural interaction. Therefore, as long as a technology is able to satisfy the above purposes, such technology is called virtual reality technology [1].

### 2.2 Characteristics of Virtual Reality

#### 2.2.1 Immersiveness

Immersiveness means that virtual reality technology puts people in a virtual environment according to their visual, auditory senses characteristics, and thus these people are in a way related to things in the virtual world and are able to interact with them with responses that a similar to real-life physical responses. This virtual immersiveness gives users feelings as if they are in a real world.

#### 2.2.1 Interactivity

The virtual reality system offers the experience and interactivity of the simulated physical world. This interactivity leads to the conventional way of thinking the computer as the subject gradually being replaced by the idea that "humankind is the subject". This shows that virtual reality enables us to use a variety of interactive devices that has an exclusive usage to interact deeply with the information propagation environment, so as to reaching new integration and interaction between human and machine [2].

### 2.2.3 Imaginatively

Virtual reality reflects designers' concepts through an infective and imaginative way, and interact naturally using certain techniques. Meanwhile, such imaginatively helps teachers give instructions to students with divergent thinking during the process of animation teaching. Through mental trainings such as animation figure construction training and scene setting training, innovation and artistic imagination of the students are fostered.

## 3. Main Problems Found in Present Animation Teaching

### 3.1 Curriculum that is Weak in Presentation and Single in Content

Animation is a major that emphasizes practice, the main aim of which being strengthening the practice training of students. However, recent trends show that animation teaching is leaning towards knowledge lecturing, while the teaching method of practice training course is weak in presentation and single in content, in which case students tend to show a lack of motivation towards practicing, thus resulting in a lack of on-hand experience. Above concludes the urgency to tackle this problem at present.

### 3.2 Lack of Empathy Training to Students over Animation, Productions in Need of more Profound Concepts and Connotations

Empathy with the production is necessary when learning animation, so as to express concept of profoundness and utmost creativity. Students design in full detail the structure and model of animation utilizing 3D software and present a final effect using 3D material. At this stage, models are merely produced in the computer and a the formality of such models is single-toned and lacks vividness, leading to an increase in the difficulty of designing animation as a whole and of managing details in the animation. Such design experience makes it impossible for students to hold accurate estimations of the size and dimensions of the model, which leads to the final production being single-toned in connotation and lacking vividness in concept. Such results affect especially the following animation derivatives and make them unable to reach expected goals.

### 3.3 Classroom Teaching Cases that are too Conventional and Old-fashioned

Animation teaching still follows the traditional teaching method that is single and flat, making the teaching single-toned and students unable to grasp the complete details of animation production comprehensively. The teaching model cases are basically displayed in static form, and the accuracy in details are largely absent. These have led to the cases used in the current animation teaching being too traditional and old-fashioned, and the students lack a comprehensive feeling and experience over the cases.

Based on the summary of the animation course teaching system, the following problems are obvious: First, the teaching course is weak in presentation and single-toned in content, making it relatively difficult for students to perceive with integrity the use of animation techniques, and it is difficult to achieve a comprehensive display in animation teaching; Secondly, the animation knowledge taught in the classroom generally lacks empathy and comprehension, and the productions lack profound concepts and connotations. Most of the productions are presented in a flat and static way, which leads to the lag of students' active learning awareness. Finally, the teaching cases are too traditional and old-fashioned. As a result, interaction and communication between teachers and students are absent.

## 4. Significance of Virtual Reality in Animation Teaching

### 4.1 Enhance Demonstration Effectiveness

Nature scenic that are not restorable in life or those that are already there can be reproduced using virtual reality technology. Visualizing and clarifying abstract things and theories enables students to

fully observe things from all perspectives. Virtual resources with interactivity are offered to student, thus resulting in better teaching effect and learning experience and students motivated with awareness of creation.

### 4.2 Arouse Students' Interest in Exploring Creatively

Virtual Reality Technologies can simulate based on different characters, movements, environments and visuals. They can also construct personalized virtual atmosphere, enabling students with different needs to explore freely in virtual resources and learn in a nature atmosphere. Virtual reality technology can also assist in the discussion, Q&A, presentation and feedback process of teaching. Students can discuss and interact freely over the animation production, experience the integrity and abundance of the idea from several aspects, perceive the diversified expression of different designs in the best visual effect.

### 4.3 Add Interactivity to the Course

Practice is the most important section of animation course designing, which requires students to participate actively in the production and learning of projects, thus cultivating thinking of a designer. During the practicing training process, students can immerge in the interactive experience of virtual animation characters, which is beneficial to their skills. For instance, in the course of character construction, instructors can utilize virtual reality technologies for students to interact with different animation characters in different scenes. By experiencing in depth the whole process of production process, students are able to experience the producing theories of animation character production and structural changes, so as to make improvements and adjustments to the design plan [3].

## 5. Application of Virtual Reality Technology in Animation Teaching

### 5.1 Enhancing Virtual Expansive Training

Speaking of the application of VR teaching system to animation courses, taking the animation movement course as an example, in the traditional animation classroom teaching of walking movements, instructors usually use performance, blackboard or multimedia to lecture the basic movement of people walking. Such conventional way is presented in a flat and static way, during which it is usually the case that the head, body, hands, feet and other parts are decomposed, and then recombined. And in the process, the regularity of these parts' movement is explored and explained. These traditional methods are not contributive to the intuitive, comprehensive and three-dimensional viewing and experiencing by the students of the entire movement, they also construct barriers to students when divergent thinking and creating art. Combining virtual reality with animation courses can make this problem easier to solve. Virtual reality technology can guide students' into feeling and experiencing the course content in a dynamic, interactive and brand-new way. When utilizing VR in teaching walking movement, teachers can first import the model, students can then use the equipment to capture the dynamic process of character walking with accuracy and speed, while it can also be played frame by frame, which not only deepens the students' understanding of the animation movement, but also encourages students to have the desire to create and explore in animation learning [4]. Meanwhile, in terms of the availability of teaching resources, VR technology has gradually formed a three-dimensional virtual resource to replace the traditional two-dimensional and static resource system [5].

### 5.2 Establish an Immersive Teaching Domain

"Immersion" is an important morphological feature of the combination of animation teaching and VR technology. Immersive learning refers to students using VR technology to learn various animation skills, which can help students overcome the difficulties in animation learning. Such virtual teaching has changed the conventional teaching methods in the past. For instance, during the model producing process, students can be immersed in the structure and actions of the three-dimensional virtual reality model, which contributes to a more intuitive, vivid and clear

demonstration of the concept of models, and a more intuitive and visualized environment for students' abstract learning. Through the combination of model constructing courses and virtual reality technologies, students are better at visually reconstructing and fully perceiving 3D animation models in an animation scenario. Such immersive teaching domain leads students to paying attention to multiple senses in model constructing courses, and further enables students in multi-dimensions including vision, hearing, imagination, judgment, creativity, etc., and gradually develop their sensory potential, thus promoting the process of knowledge transformation. The human-machine interaction embodied in immersion while teaching can enable students to “dialogue” with the knowledge they are learning, so that the students can be fully immersed in the domain of VR teaching.

### 5.3 Virtual Practice Training Improvement

Practical teaching is an important part of the animation major teaching. It provides students with an efficient and convenient domain where they can participate in and share online, that is to say, a virtual domain that enables practical operating and helps students integrate swiftly into the environment so that they can learn knowledge in a comprehensive and three-dimensional manner. In this virtual reality environment, students can freely simulate various animated characters, paths, actions by applying VR devices. Using sensory equipment such as digital gloves to set virtual animations and human interactions can enable students to better understand animation production as it is. At the same time, students can also establish virtual practice groups utilizing this domain environment and work as an independent group to accomplish professional learning task towards a shared learning goal. These practice operations can not only save practice time and remove viewing restrictions, but also offer a comprehensive and three-dimensional realistic practice experience. At the same time, in virtual practice teaching, students are encouraged to be active instead of being passive, thus transforming learning process into an experience, expanding the space of virtual teaching, so as to improving students' absorption and perception of animation knowledge.

### 5.4 Online Teaching

Online Teaching consists of teaching environment and learning environment both in a digitalized way. This teaching method is becoming a major scene where students acquire and perceive knowledge. Both teachers and students are restricted by computer network when they input and output information [6]. Meanwhile, teachers benefit from remote teaching by expanding knowledge. During this online teaching process, virtual reality system can better achieve interactive experience learning of online curriculum and construct a communication model that is natural and vivid, where teachers and students are able to apply virtual reality’s multi-dimensional online interactive resources to sharing and communicating over learning materials.

## 6. Conclusion

Teachings in animation major should broaden its frontier of new technologies and new domains based on virtual reality technology, which not only offers full-around virtual information and resources, but also assist students perceive knowledge in a way of fullness and vividness. Such assistance offers the opportunity to experience and participate as a practitioner, and is a demonstration of the education concept of putting students first.

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