

# Research on Application of Digital Art and Virtual Reality in Animal Medical Education

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**Abstract:** With the development of social science and technology, digital technology has been widely used in all walks of life. Especially in the field of medical education, the rational application of digital technology will create a simulated learning environment for students, which has a key impact on the improvement of medical education. This article is an analysis of the application of art and virtual reality in animal medical education. I hope that this analysis can play a certain role in improving the effect of today's animal medical education, and provide a certain reference value for the reasonable application of digital technology and virtual reality technology in today's animal medical education.

**Keywords:** Digital art; Virtual reality technology; Animal medical education; Application

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## 1 Introduction

Because animal medicine belongs to an experimental discipline, practical teaching is also the most important teaching method in the teaching process of animal medicine. In the traditional teaching of animal medicine, teachers usually combine the teaching of morphology-based theory with experimental courses. This teaching mode is based on animal specimens, but as the specimens are limited, students in most cases, watches the teacher, and there is rarely a chance for hands-on experiments. Such a situation will directly lead to poor practical skills and insufficient practical experience of students of animal medicine majors,

which will be very detrimental to the learning and development of students. The lack of pathological samples and the use of original specimens for too long will further reduce the teaching effectiveness of animal medicine. Based on this situation, in today's animal medicine teaching process, many teachers have introduced virtual reality technology. Through the application of this technology, students can create a digital learning space similar to the real situation and provide enough samples for students in the space, so that every student has the opportunity to do experiments on their own. This is very beneficial to the improvement of the teaching effect of animal medicine specialty and the accumulation of students' ability and experience.

## 2 About virtual reality technology

Virtual technology is an immersive interactive environment based on computable information. Specifically, virtual reality technology is based on today's advanced computer technology combining multimedia technology, computer graphics technology, artificial intelligence technology, sensor technology, human-machine interface technology and highly parallel real-time computing technology to form a realistic virtual environment that integrates vision, hearing and touch in a specific range<sup>[1]</sup>. When in use, users can realize interaction and influence through natural methods and virtual objects in this virtual environment only with the help of corresponding devices, and then bring users an immersive real feeling and experience.

With the continuous development of today's social economy and science and technology, virtual reality technology has been widely used in the medical field and is called virtual medicine or simulation medicine.

Today, this technology is very applicable in medical teaching, disease diagnosis, rehabilitation, telemedicine, and surgery simulation, and has played a strong role and advantage in these areas, and it is welcomed and recognized by the medical community.

### **3 Application of virtual reality technology in animal medicine**

With the increasing emphasis on rare animals in today's society, and more and more valuable pets coming into the family, medical care is a vital content for protecting animals and protecting pets in people's homes. In the continuous development of animal medicine and science and technology, we also need to apply virtual reality technology to the field of animal medicine and carry out in-depth research.

#### **3.1 Virtual animal entity**

The so-called virtual animal entity is based on the information of animal morphology, biology, and physics, and the use of large-scale computer processing to realize the virtualization of animal entities, and then establish a technical research platform to replace it. Real animal specimen experiments make up for the limitations brought by the shortage of animal specimens to students. This technology is a visual simulation of the digitalization of animal body's micro-to-macro structure and functions, and then completely describes the animal's genes, proteins, cells, tissues and organs' forms and functions, and then accurately realizes simulation of animal entity information<sup>[2]</sup>.

The so-called virtual animal entity is actually a three-dimensional animal body structure synthesized with the help of digital computer technology. In the application of virtual reality technology to the collection of animal body structure information, you first need to select a corpse that needs to simulate an animal, then cut this corpse into a particularly thin slice, and use a digital camera and scanner to take a picture of the cut surface of each slice, scan and analyze, and then input the analyzed data into the computer. After the slice of the entire animal body is completed, the animal body will form a complete set of physical data in the computer. These data can be synthesized into a three-dimensional animal physiological structure by a computer.

#### **3.2 Virtual animal surgery**

Virtual animal surgery is an animal surgery process

realized through virtual equipment. In this process, a variety of animal medical image data is combined with computer technology, medical imaging technology, virtual reality technology, image processing technology, robotics technology, surgical technology, etc. to establish a virtual surgery environment. With the information in this virtual environment, veterinarians can successfully perform animal surgery. With this technology, not only can the process of the surgery be simulated, but also the planning of the surgery can be performed before the surgery<sup>[3]</sup>. With the aid of a surgical simulator, you can perform surgical simulations on various important areas of the animal's body. Before the operation, the veterinarian can make reasonable improvements to the expected surgical design through simulation experiments to ensure the safe operation of the entire surgical process and further improve the accuracy of the operation.

This form of simulated surgery is mainly used in daily surgery training in animal medicine, especially for some difficult animal cases or new animal surgery. Before the operation is officially performed, the animal doctor can first go through a virtual operating table to perform a surgical operation, and then based on the virtual operation to develop the best surgical plan. In this way, the actual operation time can be effectively shortened, and the probability of surgical errors can be further reduced. While ensuring the safety of the animal's life, it can also effectively reduce the pain caused by the operation to the animal.

#### **3.3 Telemedicine**

By combining virtual reality technology with today's network technology, telemedicine can be achieved. In this process, the animal doctor only needs to follow the live images transmitted through the network and control the mouse, keyboard, and digital gloves to perform a virtual operation on the animal's surgical model. During the operation by the animal doctor, the actions will be transmitted to the surgical robot through a satellite, and then the surgical robot will actually perform surgery on the animal according to the operation method of the animal doctor<sup>[4]</sup>. At the same time, during the operation of the robot for animal surgery, all the surgical progress and operation methods will be transmitted to the animal doctor in the form of images. The image on the stereoscopic display of the animal doctor's helmet will coincide with the actual surgical image and can provide

enough useful information to the animal doctor.

### **3.4 Virtual Lab**

By linking today's multimedia technology, hardware-in-the-loop simulation technology, and virtual reality technology, a virtual laboratory can be constructed through which the clinical skills of veterinarians can be trained. In this virtual laboratory, most of the components and equipment are realized through virtual. With the continuous updating of related technologies and equipment, technicians can also update the related technologies and equipment in this virtual laboratory.

To establish a good virtual experiment environment, we must first acquire 3D data in the real environment. During the acquisition process, relevant personnel can realize it through CAD technology and non-contact visual modeling technology, and then give them interactive capabilities by means of stereo reality technology and sensor technology. After the virtual laboratory is set up, animal doctors can operate every instrument and equipment in this virtual laboratory by operating a computer<sup>[5]</sup>. After a virtual operation is completed, all instrument, equipment and virtual samples can be continuously reused. In this way, the animal doctor can correct errors in the operation in a timely manner. This will accumulate more clinical experience for animal doctors.

## **4 Application analysis of virtual reality technology in animal medicine teaching**

### **4.1 Application in animal medical education**

In the education of veterinary medicine, through virtual reality technology, many teaching forms such as surgical teaching of veterinary medicine, freshman training in veterinary medicine, technical learning, technical testing, and surgical planning can be performed. In the teaching of animal medicine today, virtual reality technology can be mainly used in animal anatomy, virtual laboratory and virtual surgery. Through the virtual anatomical situation of animal entities, students can experience tactile feedback during the operation of virtual organs and tissues, so that they can further clarify the technical aspects of surgery. Through the virtual surgery technology, students of animal medicine and even animal doctors can learn new surgical procedures and methods first, and make and modify surgical plans through repeated virtual exercises<sup>[6]</sup>. After completing the operation, they can

also review the operation process again. At the same time, through virtual surgery, teachers can also make more scientific and objective assessments of students' skills and operating methods.

With the continuous development of science and technology and the increasing emphasis on animal medicine in the society, in the teaching process of animal medicine, both teachers and students cannot be confined to the level of studying books, but through continuous practice to improve clinical technology and enrich clinical experience. Since the real practice opportunities provided by the school are very limited, it is impossible for students to devote time and effort to specialized practice learning. Therefore, the application of virtual reality technology to the teaching of animal medicine can provide students with a virtual learning scene that can be "false and real." Through this virtual learning scene, students can continue to practice training. Not only can it reduce the economic consumption of expensive animal experiments, but it also allows every student to get enough opportunities for practice. This plays a key role in improving the teaching effect of animal medicine specialty and accumulating student technology and experience.

### **4.2 Application in experimental teaching**

Experimental teaching is an indispensable content in the teaching of animal medicine. In experimental teaching, instruments and equipment are the basis of teaching. However, because advanced instruments and equipment are very expensive, bulky, and occupy a large area. In addition, students have limited technology and experience, and their operating standards are insufficient. Therefore, if real instruments are used, equipment for experimental teaching will consume huge teaching costs. Based on this situation, we can use existing computer resources and design hardware and software to virtualize functions that cannot be achieved by ordinary instruments, so that the problems of advanced instruments can be effectively solved<sup>[7]</sup>.

Nowadays, many college animal medicine majors have begun to apply virtual instruments and equipment, and virtual instrument technology has begun to be more and more popular with animal medicine teachers and students. The reason why virtual instruments are highly valued by the majors of animal medicine in universities is mainly because the hardware and software in virtual instruments can be flexibly configured according to the actual needs of teaching and have good repeatability.

According to the actual experimental needs, each new set of virtual instruments can develop test instrument systems with different functions. Through the application of virtual instrument, students can not only fully appreciate the wide applicability of virtual instruments themselves but also possible to conduct a comprehensive survey of students' ability to flexibly use knowledge and technology, which is very beneficial to the cultivation of research ability and innovative ability of students of animal medicine.

### 4.3 Application in distance education

At present, the enrollment expansion of major universities has become an obvious development trend, but after many universities have expanded enrollment, the differences in teaching configuration have become increasingly serious. In order to solve this problem, students of veterinary medicine majors have the same level of education in different campuses. Colleges and universities can apply virtual reality technology to the distance education of animal medicine majors, so that students can be provided with a mobile e-learning place, using interactive distance learning mode, and creating corresponding website links through the local area network scan provide open and continuous education for each terminal. In this way, not only can students provide sufficient learning opportunities, but also can provide higher distance education to the society, thereby creating greater economic benefits and social value. At the same time, we can also build a "virtual university" with the help of virtual reality technology, so that we can achieve good education for students without consuming or reducing the consumption of actual teaching resources and teaching energy<sup>[8]</sup>. This is also very beneficial for the learning and development of animal medicine enthusiasts.

With the continuous development and improvement of today's virtual reality technology, the prices of various related hardware equipment are also steadily decreasing. Therefore, with the continuous development of social economy and science and technology, the research cost of virtual reality technology will also continue to increase. Reductions will bring great benefits to the application and development of virtual technology. Therefore, the application of virtual reality technology to the distance teaching of animal medicine majors in universities will further enhance the teaching advantages and teaching potential of animal medicine majors, meet the learning needs of animal medicine students, and improve the teaching effect of animal

medicine majors.

## 5 Conclusion

In summary, with the continuous development of today's social economy and science and technology, the teaching level and quality of animal medicine will be further improved. Applying virtual reality technology to the teaching and practice of animal medicine can provide students with a virtual surgery, experiment, and learning environment, effectively solve the problem of insufficient animal samples, and allow each student to get enough practice opportunities. Through the application of virtual reality technology in the experimental teaching of animal medicine specialty, the application of virtual instruments and the application of distance teaching, students can fully grasp the relevant processes and technologies of animal medical surgery and be familiar with the use of various instruments. Standardization plays a key role in improving the knowledge, skills and experience of animal medicine students. It is believed that with the continuous application and development of virtual reality technology, the advantages of this technology in the teaching of animal medicine will become more and more obvious, which will effectively improve the teaching quality of animal medicine and promote the good development of animal medicine.

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