Discussion on the Innovation of Computer Virtual Reality Technology in the Training and Teaching of Aerobics in Vocational Colleges

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Abstract. Virtual reality technology is a new technology which is based on the Internet and integrates a variety of information technologies. In only ten years, it has penetrated into the daily life of human beings. Based on the analysis of the principle of virtual reality technology and the actual characteristics of aerobics training, this paper expounds the application of virtual reality technology in the field of aerobics training. On this basis, through the analysis of examples, this paper further constructs the aerobics training innovation in vocational college education and teaching, and prospects the future development of virtual reality technology in the field of physical training.

Keywords: Computer virtual technology · Vocational colleges · Aerobics training

1 Introduction

Ancient Greeks are famous for their respect for human beauty. They believe that in all things in the world, only the body building is the most symmetrical, harmonious, solemn and most vigorous. Ancient Greeks like to use running, throwing, soft gymnastics and bodybuilding dance to exercise the beauty of human body. They put forward the idea of "Gymnastics exercises, music edifies the spirit". The appearance of gymnastics is an important factor in the formation of aerobics.

In ancient India, a yoga technique was popular for a long time. It combined posture, breath and mind closely. It adjusted body (posture), breathing (adjusting breath), adjusting heart (meaning to keep the dandian quiet), self-regulation of body and body by using consciousness, and body building, and reaching the life extension. Yoga fitness movement includes standing, kneeling, sitting, lying, lunge and other basic posture. These postures are consistent with the basic postures commonly used in the current popular aerobics. The pursuit of fitness and fitness by ancient people and the idea of combining gymnastics with music are the foundation of the formation and development of modern Aerobics.

At the end of 19th century and early 20th century, there were many gymnastics schools in Europe. Their innovation in theory and practice played a role in promoting

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the development of aerobics. In the early 1960s, it was the germination period of aerobics. It was the first physical training content designed by Dr. Cooper, a doctor of NASA, for astronauts. In the early 1980s, with the development of fitness fever and entertainment sports all over the world, aerobics has become popular in the world with its strong vitality. The United States is a country that has an important influence on the development of World Aerobics. Its representative, film star Jane Fonda, wrote a book "Jane fonta health art" according to his own fitness experience and experience. The book has caused a stir in the world since it was published in 1981. She has promoted the promotion of Aerobics worldwide by her present example. At the same time, since 1985, the United States officially held the annual Aerobics Championships, and determined the competition items and rules, so that aerobics development into competitive sports.

Aerobics not only develops rapidly in the United States, Britain, France and other countries, but also has been carried out in some developing countries and regions to different extent. The former Soviet Union has already included Aerobics in the physical education syllabus of the major, middle and primary schools. In Asia, Japan, Philippines, Singapore and other countries have also built many aerobics activity centers and fitness clubs. People begin to take aerobics as their main fitness mode, thus forming a worldwide "aerobics fever".

Aerobics originated in 1968. In 1983, the first aerobics competition was held in the United States and the first far east aerobics competition in 1984 was held in Japan. Therefore, aerobics has been widely used in all over the world. The annual international events are: World Championships of aerobics, world cup, world championships and world tour.

In September 1992, China aerobics association was established, with its headquarter in Beijing. In 1987, Beijing held the first national aerobics Invitational Competition, followed by four Invitational competitions in Beijing, Guiyang, Kunming and Beijing in 1988, 1989, 1990 and 1991. Since 1992, it has been renamed the national championship, which has become a traditional event held every year.

In addition, in 1992 and 1995, two National Aerobics Championships were held in Beijing. In 1998, the national championship and national aerobics games were held.

With the continuous improvement of people's living standard, more and more people pay attention to the practical value of health care, medical treatment, fitness, bodybuilding and entertainment. It attracts fans of different ages to participate in it and forms a certain scale of consumer group. TV stations at all levels have produced special programs with aerobics competition and popularization as their content, and their video reception rate is far higher than other programs.

Because aerobics competition can be held in the gymnasium and stage, and the characteristics of the field use concentration in aerobics, it creates opportunities for enterprises to carry out advertising and publicity in combination with the competition. Aerobics project is favored by more and more enterprises.

2 Definition of Concept

2.1 Virtual Reality

Virtual reality, or virtual reality, was put forward by Jaron Lanier, a famous computer scientist and founder of VPL research in 1989. Its basic meaning is as follows: (1) use computer graphics system to unify various display and management interface instruments. (2) It can be produced on the computer and can produce immersion feeling in the simulation environment of human-computer interaction. In other words, virtual reality is the description of the real world, with the framework of the real world, but also in the virtual environment for human-computer interaction.

2.2 Sports System Simulation Platform

Sports system simulation platform, namely sports simulation support environment, is a set of software [1]. The platform consists of assistant modeling, model debugging and operation support system. Through the organic combination of these systems, we can provide users with a simulated real sports environment in the whole simulation cycle.

2.3 Principle of Motion Attitude Detection Based on Nine Axis Sensor

Generally, Euler angle, quaternion, moment or axis angle are used to express attitude. Different expressions are used in different fields, and each expression has its own advantages, Euler angle and sicai onhard Euler are the representation methods used in this project. Euler angle was first proposed to describe the orientation of rigid body in three-dimensional Euclidean space. The following mathematical model can be used to describe the mobility.

For a reference system in three-dimensional space, the orientation of any coordinate system can be expressed by three Euler angles [2]. The reference system is also known as the laboratory reference system. It is a static coordinate system, which is determined by the rigid body and rotates with the rotation of the rigid body, as shown in Fig. 1.

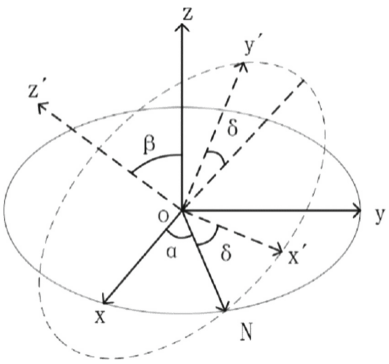

Fig. 1. Euler angle rotation coordinate system

The following mathematical model can be used to describe the mobility:

$$y = A - Tanh(B - K * x) \tag{1}$$

3 Discussion on the Application Principle of Virtual Reality Technology in the Field of Aerobics Training

3.1 The Basic Architecture of Aerobics System Simulation Platform Based on Virtual Reality Technology

Aerobics system simulation platform is a computer simulation system which uses virtual reality technology to simulate aerobics training. The core of the system is data collection, establishment of three-dimensional model and construction of virtual reality environment. The core of aerobics training simulation platform is the common basic structure. That is, data acquisition relies on position and direction tracking, data glove, conversion equipment, glove input conversion instrument and other components of the input system. The establishment of three-dimensional model depends on the generation of effect and the conversion of signal to build the defined output system to complete the aerobics virtual reality training environment. The main components are as follows: first, the user's use system; second, the three-dimensional space disposal instrument; third, the three-dimensional model database; fourth, the simulation manager; fifth, the computer and all kinds of feedback equipment.

3.2 Working Principle of Sports System Simulation Platform Based on Virtual Reality Technology

Data acquisition and analysis virtual reality technology essentially relies on the big data generation under cloud computing, that is, a large number of Aerobics data is input into the virtual environment generator, through the system software to analyze these data, and then use signal converter, raster display and other processing, so as to achieve the desired virtual effect [3]. The main purpose of data analysis is to realize the following functions, that is, to build training virtual reality scene and equipment in aerobics training, to capture Aerobics Athletes' data, to collect their physiological, biochemical and psychological data, so as to analyze the data, to reconstruct after deconstruction, to realize the repetition and display of aerobics actions, so as to achieve the analysis of training effect and the role of scientific selection.

4 Basic Principle and Theoretical Application Environment of Aerobics System Simulation Platform

The application of virtual reality media technology is to transform the basic movements of Aerobics into video information, label and explain them. In the process of training, according to the actual situation of teaching, the prescribed movements are repeatedly

broadcast and taught, and then through the correct demonstration of the coach, the students can show clear Aerobics movements in their brains, so that they can intuitively grasp the essentials of the movements and speed up their learning, Promote the enthusiasm and initiative of students in learning and training. At the same time, it can also effectively find the error, and through the discussion of the causes of the error action, it can effectively correct the problem. In theory, virtual reality technology in the field of aerobics can be applied to the following three aspects.

(1) The virtual simulation training model and virtual reality training environment are established.
(2) Simulate the key actions.
(3) The recreation of Aerobics action.

5 The Application of Virtual Reality Technology in the Field of Aerobics Training

5.1 Characteristics of Aerobics Training

Aerobics combines dance art and sports, so in aerobics, the training content system of both has its own characteristics. Aerobics training includes three major contents, each of which can be decomposed. The three major items include comprehensive physical training, including strength, flexibility and endurance; action skill training, including basic action skills, standard action and difficult action; aerobics overall quality training, including aerobics integration ability, music experience and performance ability, aerobics creativity and psychological quality training.

5.2 Data Acquisition and 3D Model Construction of Virtual Reality Technology

Using virtual reality technology to carry out aerobics training, the first step is to capture the trainer's movement data. In the construction of human skeleton, quaternion representation is widely used in the field of virtual reality to calculate the rotation of joint points. By obtaining the rotation of all joint points, the root joint point is located, and the human motion data is collected through the relative position. After obtaining a large number of relevant data, the aerobics training database is established, and the three-dimensional model of Aerobics athletes is established by reorganizing the data. Generally speaking, the model is an athlete in virtual reality. In the performance of aerobics, it can be said that the model in virtual reality is equal to the real athlete. Through the analysis of virtual athletes, aerobics athletes will greatly improve their awareness of their own state (see Fig. 2).

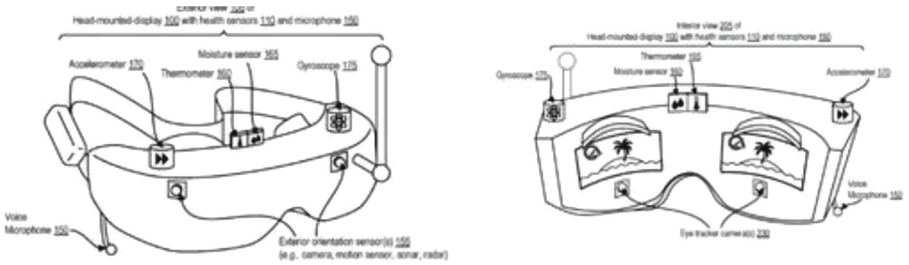

Fig. 2. VR simulation and use

5.3 Construction of Aerobics System Simulation Platform

In the field of aerobics training, in order to improve the training efficiency, we can use virtual reality technology to build aerobics system simulation platform. The platform consists of three independent and co operating sub platforms, that is, action generation sub platform. Its function is to rearrange the aerobics action based on the data captured by sensors on the scientific basis. The sub platform of action mode design is to design the action mode of aerobics. The group formation mode change simulation sub platform is a simulation model based on virtual reality technology [4–6]. Through data input, the aerobics formation will be changed from the initial state to the final state. Under the virtual reality environment, the mode of model team change can provide help for the aerobics formation mode design (see Fig. 3).

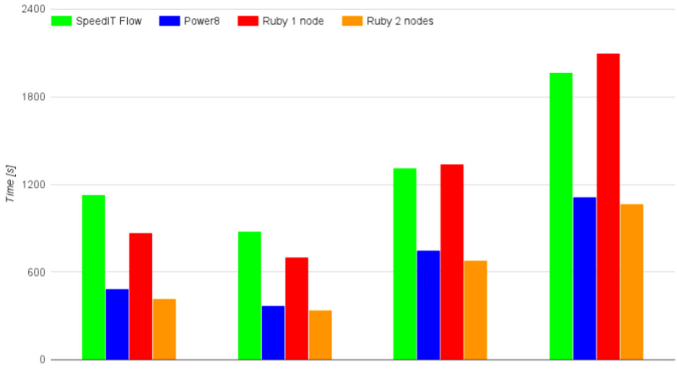

Fig. 3. Simulation time for VR

6 The Dilemma of Improving Aerobics Teaching in College Physical Education

With the continuous development of curriculum reform in Colleges and universities, aerobics is no longer a fixed traditional teaching method. Under the guidance of the idea

of health first and lifelong education, our College Aerobics teachers have been able to choose the main content of aerobics teaching according to students' interests and hobbies. At the same time, it can also stimulate the independent exercise of contemporary college students and cultivate their awareness of exercise. However, with the further deepening of the curriculum reform in Colleges and universities, there are still many drawbacks in our aerobics teaching, which form a dilemma for Contemporary College Physical Education and hinder the normal development of aerobics teaching.

6.1 Under the New Curriculum Reform, the New Goal of Teaching Idea is Combined with the Modern Teaching Mode

Now our College Aerobics Teaching Reform, although has been fully spread out, but our traditional teaching methods can not be completely abandoned. In order to set the goal, we need to realize the reform of teaching, improve our syllabus and teaching mode, which has become an important content in the process of college physical education reform [7]. However, in the process of the teaching of health exercises, the demonstration teaching of our university teachers still plays a leading role. The teaching of university teachers can not be completely wiped out, and the whole classroom should be handed over to the students. There must be a big difference between College Students' active learning and passive learning, but without listening and imitating the learning process, we can not achieve the set goal of teaching [8, 9]. After we give the classroom to college students, although there are more exchanges between college students, such exchanges are not for cooperation in aerobics, there will be many students in the process of laziness and chatting. Therefore, the aerobics teaching in Colleges and universities should be combined with the new teaching goal and teaching mode. Let the students in this environment really aerobics exercise, further improve the creative ability.

6.2 We use the Aerobics Teaching Material is not Targeted, the Content of Theory Teaching is not Enough

Through the analysis of many versions of aerobics teaching materials, we will find that the order is not targeted enough, and the service object is to face the students of Public Physical Education in Colleges and universities or the students of Aerobics major in physical education colleges and universities, whether it is the teaching materials used by teachers or students' learning, and whether it is the teaching materials of compulsory courses or elective courses, Almost all teaching materials are the same, so the result is that it is difficult to reflect the special nature of physical education [10–12]. At present, the teaching content of Aerobics theory course in most universities only includes the sports value, overview, characteristics, significance of aerobics and a brief introduction to the methods of competitive aerobics, There are only a few sports colleges and universities involved in the scientific exercise of aerobics, as well as the principles, sports evaluation, methods, physiological health and sports health knowledge creation methods. We should advocate fitness. The basic theory of sports fitness is these insiders. Only by mastering the scientific principles and methods of fitness, can we better integrate theory with practice and get healthy development in practice.

7 Analysis on the Strategy of Innovative Education in College Physical Aerobics Teaching

Aerobics teaching must combine theory with practice, and the theoretical framework can not be ignored. We use multimedia to carry out the teaching process of practice course and theory course, and combine theoretical knowledge with practical action. In addition, our university teachers can widely use the social media such as microblog, QQ and wechat, which are widely used in college students, to learn the theory and experience of mutual exchange. We should strengthen the knowledge construction and promote the continuous development of Aerobics Teaching in Colleges and universities. Just as colleges and universities can adopt campus forum, we need to discuss the rules of competition, the cooperation and innovation of techniques and tactics, and the results of competition.

7.1 To Build a Matching Aerobics Teaching Mode with the Goal of Students' Ability Training

In the classroom teaching of Aerobics in Colleges and universities, we should establish a healthy educational concept, advocate students to actively learn aerobics, and carry out with various teaching methods. Through improving personal ability training as the basis of aerobics teaching. In the process of physical education and teaching in Colleges and universities, we should take the ability training of college students as the basis to build a modern aerobics teaching method in line with the aerobics syllabus [13, 14]. As shown in Fig. 4. We should use scientific teaching methods and teaching means to reflect the theory and practice of aerobics. We must let students understand the connotation of aerobics. We should build on the basis of basic movements and exercise essentials to promote students' autonomous learning and practice their own ability.

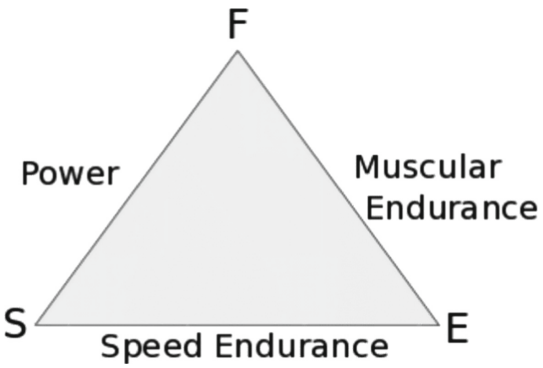

Fig. 4. Goal of students' ability training

7.2 Scientific and Reasonable Construction of Aerobics Evaluation System

Aerobics in university courses should be assessed according to the contents of the semester, and the grades should be used to evaluate the results [15]. However, this kind of evaluation mode will have certain limitations and compulsion, which is separated from all aspects of education. We should respect students' subjective consciousness and needs, and promote the healthy development of College Students' personality. One of the basic ideas of the setting of aerobics teaching content is that the assessment of aerobics course is flexible [16–18]. According to this teaching concept, the evaluation of aerobics class should pay attention to the mastery of College Students' sports skills and the improvement of College Students' comprehensive quality, including college students' sense of social responsibility, lifelong exercise desire and ability, innovation and practice ability. Only by making our evaluation results more reasonable and objective, can it be helpful for our university teachers to use feedback information to guide teaching.

8 Epilogue

In a word, virtual reality is creating a new world with the trend of destroying the past. To borrow a sentence from the Goldman Sachs report, fundamentally speaking, virtual technology has created a new and even more intuitive way to interact with computers [19]. Virtual reality technology will provide us with a greater vision. As far as aerobics training is concerned, people will no longer be bound by the original training system, which means that the easy-to-use property and wide application potential of virtual reality technology, coupled with the broad development [20, 21]. Promotion and development prospects of sports simulation training system, this system and technology will be greatly developed in the field of sports training.

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