



## **Quality Analysis of Physical Education Professional Training in Universities based on Virtual Technology in Physical Fitness Training**

Chang Yongshan  
Institut Teknologi Bandung  
Bandung City, Indonesia  
[tyerte23423@fastmail.fm](mailto:tyerte23423@fastmail.fm)

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### **ABSTRACT**

*With the continuous development of technology, virtual technology has gradually penetrated various fields. In the field of sports, virtual technology has also been widely applied. Especially in the training of physical education majors in universities, the application of virtual technology has become a trend. This article analyses the quality of college physical education professional training based on virtual technology in physical fitness training. Through virtual technology, coaches can more accurately grasp the physical condition of athletes, develop more targeted training plans, and improve the training effectiveness of athletes. At the same time, athletes can also engage in autonomous training through virtual technology to improve their physical fitness level.*

**Received: 18 September 2023**

**Revised: 17 December 2023**

**Accepted: 27 December 2023**

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**Keywords:** Computer, Virtual Reality Technology, Chinese University Sports, Comprehensive Level

### **1. Introduction**

*The rapid development of science and technology can provide a solid material foundation for education and teaching. Modern high-tech achievements have involved education, teaching and training, making great educational changes. Through the use of advanced scientific and technological means, all the theories, methods, physical education and training aspects that are beneficial to improving teaching effectiveness should be fully utilized. Improving the overall effect of teaching and training is an urgent task of physical education, and by using this theory, the way to improve the status of sports and training is a problem for every university gym teacher. Because of the development of computer virtual technology, to improve the level and quality of the work, it is necessary to use this advanced technology to reform the traditional sports teaching and training methods and open up a new pattern. The current computer virtual reality technology is a new technology in recent years, which has been widely used in various fields and has played a significant role. In this paper, the characteristics of virtual reality technology were analyzed and its technological advantages were fully played. In addition, the university sports training was*

combined with the research process. The purpose was to improve college athletes' technical level and quality and contribute to the reserve of Chinese sports talents.

## 2. The State of the Art

*In the past 50 years since the founding of the People's Republic of China, the development process of school physical education has been tortuous. Still, as a whole, there have been the most perfect systems and the most abundant teachers in the sports class [1]. First of all, sports are part of our education policy, rather than just the content of our education, thus pointing out the position of sports in school education, and the development direction of the basic goal of our school sports [2]. From the Ministry of education to the school, the sports organization has been established, and the basic school sports management mechanism has been formed. From 1954 to 1956, the Ministry of Education issued the first batch of new sports teaching programs, and the State Physical Culture Administration promulgated the "The sports system ready to work and defend the motherland" [3]. By 1990, the former National Education Commission promulgated the school sports work regulations and so on and formulated a series of system and management measures for the school movement, which further defined the school movement's goal and direction [4]. Subsequently, the Institute of Physical Education was established, and the sports departments of normal universities and colleges were also established. The university set up a bachelor's degree, a master's degree, and a doctorate degree and formed a complete system of physical education teacher training [5]. The extensive activities carried out by various schools at all levels were regarded as the main contents of school sports activities with strong orientation and combat capability [6]. Finally, sports venues facilities, and equipment have continued to enrich and develop, and teaching research and reform have continued to improve, all of which have developed the role of sports in physical quality.*

## 3. Methodology

*Virtual reality (VR), a new term for high-end technology in the computer industry, aims to build network interaction, immersive and conceptualization and has achieved success [7]. The types of virtual reality are almost breathtaking. It combines high-end technologies such as artificial intelligence, computer network technology, computer graphics and multi-sensor technology [8]. The application of computer virtual technology in physical education has been regarded as the revolutionary development of educational technology, which creates a "self-study" environment, changes traditional teachings, promotes new ways of learning knowledge and skills, and provides a paradigm shift for learners through an interactive information environment [9]. When virtual computer technology is used to create virtual sports equipment, most of the scenes are virtual, and the training contents can be updated at any time according to the requirements of new equipment so that training can keep up with the development of technology [10]. At the same time, the highly interactive virtual reality allows students to play a role in the virtual environment and put themselves into the environment, which is very useful for students' skills training. The virtual training system is not dangerous; students can practice repeatedly. Figure 1 is the application of virtual reality technology in sports.*

*For many high-endurance sports, such as taekwondo and boxing, it is impossible to avoid injury accidents when training in practice, thus causing many universities to give up these courses. If students can do these dangerous exercises in the classroom with virtual computer techniques, avoiding excessive injury during training will be very good. In this unreal simulation environment, students can practice with their hands and feet without fear of other accidents. Moreover, the computer virtual environment can measure the behavior of students, correct the lack of students in the training process, and improve the quality and efficiency of training. In recent years, with the continuous development of sports technology, the technical difficulty of various combat sports is also increasing. This means many academic training of these projects will appear because of the high difficulty and harm in actual physical training. The use of computer virtualization is a good way to avoid this situation. Using virtual reality technology to carry out virtual experiments can avoid students' difficult and complex technical movements, and participants in the virtual experiment environment can safely solve all kinds of puzzles. Because the material conditions can't fully meet the sports training needs in actual sports training, each school must purchase equipment training under the funds allowance. As a result, many sports training has been cancelled due to funding problems. However, computer virtualization technology can change the status quo very*

well. Students can exercise through computer training to achieve rich enjoyment without setting up a huge training ground.



Figure 1. Application of virtual reality technology in sports

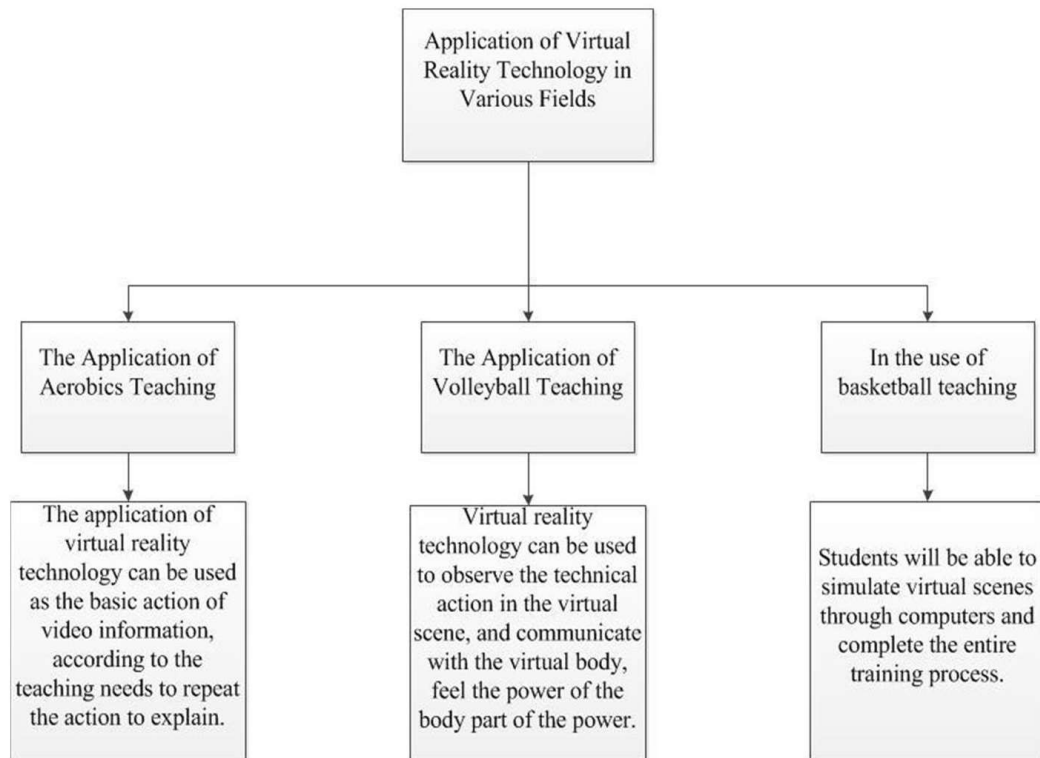


Figure 2. Application of virtual reality technology in all fields of sports

*Aerobics, a movement combining gymnastics, dance, and music to pursue human health and beauty, has a highly artistic atmosphere. Aerobics teaching not only allows students to master the flexibility of action and training but also enables students to develop their skills. In traditional teaching, some content that students can't understand but have to master is also difficult for teachers to use language to describe. Virtual reality technology can be used as the basic action of video information, accompanied by comments and repeated actions according to teaching needs. Coupled with the correct demonstration of the teacher, students will immediately form clear and complete brain technical movements and intuitively understand the main points of action so as to master the movement more quickly and practice more actively. And the mistakes are discovered in time, the causes of erroneous behaviour are discussed, and corrections are given. In the traditional volleyball teaching process, the teacher mainly explains the demonstration and carries on each kind of factor to enable the student to grasp the technology, in which the teacher grasps the student's technical situation with the naked eye, greatly affecting the teaching effect. Virtual reality technology can provide a new environment for the whole teaching process. Virtual reality technology can be used to observe the technical actions in the virtual scene and communicate with the virtual body, as well as feel the strength of the body parts, order and size of action so as to result in a sense of movement. Traditional basketball teaching mainly depends on the teacher's explanation and demonstration. With the progress of science and technology, virtual reality technology has also been used in basketball courseware and classroom teaching, which can not only complete the teaching knowledge but also demonstrate the action and the skill. The main need is to build a good simulation library and then output it through appropriate instruments so that students can complete the entire training process through a virtual scene simulated by the computer. Because the training process is computerized monitoring, students can adjust their own speed, timetable and so on, reflecting the true personalized teaching and differentiated training.*

*College and university Physical fitness training includes general and special physical fitness training. General physical fitness training is a professional sports program to improve students' physical health, organ functions and systems, and physical shape. Using various nonspecific physical exercise methods can improve students' scores and lay a good foundation for sports training. Special physical fitness training refers to directly improving physical fitness, which is sports training for students to improve their special abilities. According to the constitution of physical fitness, physical fitness training includes improving body shape and structure, improving physiological function and training physical fitness. Physical quality mainly includes strength quality (maximum strength, rapid strength, strength, and endurance), speed quality (speed of movement, speed of reaction, and speed of movement), endurance (aerobic endurance, anaerobic endurance), agility and flexibility. Body shape, function and quality are the main factors of physical fitness, while sports quality is the external expression of physical fitness. In the development of physical fitness for physical training, the most important thing is improving the quality of sports ability.*

*Computer virtual technology can analyze the students' physical ability through the movement of computer quantization technology and the result of using graphical representation, including technical analysis of specific elements such as speed, displacement, and so on, to ensure a thorough analysis of the motion process. The computer will analyze the difference between each movement and sample movement according to the analysis results. Comparing and analyzing the students' technical actions and the standard actions of the computer model is beneficial to improving the students' technical defects and can help teachers intuitively and systematically grasp and analyze students' learning. And the overall improvement of students' sports quality and sports ability plays a very important role in the promotion. The application of computer virtual technology in new sports will become a new learning mode for physical education learners. The virtual technology of various sports fields will greatly reduce the risk of sports training in the major Olympic sports system and sports entertainment, such as alpine skiing, racing, boarding, etc. In intensive indoor training or competition, there will be no avalanches, casualties or other accidents, and athletes can train before competitions to improve personal safety. Computer virtual technology can create a realm beyond which real environmental factors can't be reached. To adapt to the training of athletes' game object game mode, computer virtual technology can match the virtual objects for training, which greatly improves the athletes.*

#### **4. Result Analysis and Discussion**

*Taking aerobics as an example, computer virtual reality technology was applied to assist in this*



paper's actual research and test. According to the actual situation of the experimental class, two classes were taught once a week for two hours each time. The physical training in the two classes was different from that in the professional training class, and various types of projects were conducted through each course. Because of the special physical needs of public aerobic exercise, and focusing on fostering students' flexibility among quality, coordination and sensitivity, and based on the principle of fostering the core advantages of quality, there was a week of coordination and sensitivity training, flexible quality training, and strength and quality training. Speed, quality training, and endurance training were required every week. In addition, according to the purpose of extra-curricular teaching, extra-curricular teaching requirements, class teaching, training methods, and classroom layout training content, the heart rate was strictly tested to control the training effect. The task list of the training course is shown in Table 1.

Training time	Training task	Training content 2
The first week	Develop coordinated and sensitive quality Develop flexible qualities Develop speed quality	Stretch, spine stretch, tension leg held upright, body flexion Tick the body forward (every 1015 seconds/group*2) 30m time run (relay form *2)
The second week	Develop coordinated and sensitive quality Develop flexible qualities Develop speed quality	Small step, quick step run, straight leg jump, open and close jump (9 case/group*4) The lower part touches the chest, stretches on the straight arm, raises the vertical palm, stretches the body, and the back straight arm is called the palm stretching
The third week	Develop coordinated and sensitive quality Develop flexible qualities Develop speed quality	Two runs (two directions), quick step runs (two directions), straight legs (both directions) Straight arm upward, vertical palm stretching, straight back
The fourth week	Developing coordinated and sensitive quality Develop flexible qualities Develop speed quality	About Suibu run, jump, turn skeleton before single foot jump feet lateral change Carry the oak dance (each 9 case/group*4) Lie prone at both ends (30 / group *3)
The fifth week	Develop coordinated and sensitive quality Develop flexible qualities Develop speed quality	About Suibu run, jump, turn skeleton before single foot jump feet lateral change Carry the oak dance (each 9 case/group*4) The third set of Mass Aerobics for three consecutive groups

**Table 1. Physical education training program for five weeks in the experimental class**

Various sports training indexes are included in the table, in which the sports agility quality is an important condition for coordinating the ability of various physical qualities, improving the quality of technical movements and creating excellent sports results. The agility coordination ability has a very important function for the aerobics student, and it is advantageous to the coordinated movement of the aerobics movement and makes the whole movement harmonious and smooth. The major features of aerobics require students to have certain coordination and agility abilities. The sensitive coordination method used in this paper is the ladder training method. As for the special teaching of public sports aerobics, it is unsuitable to use highly specialized and difficult training methods, such as listening to the colour markers and accelerating forward. The ladder training is the innovation and development of sensitivity training, which can improve students' speed and coordination ability, especially the conversion action, change direction and moving ability. It can be used as an important way of sensitive training to improve the sensitivity of athletes so that it is conducive to the overall teaching and can stimulate students' interest in learning. The ladder training method used in this paper: in the beginning, it was the direction of

the line training method. In the medium term, it was trained in straight and horizontal directions. In the later stage, the horizontal combination direction training method was adopted. The main training methods included jogging, legs straight jump, jumping, single leg jumping, walking and jumping, and lateral cross straddle front jump, before and after the cross grid jump forward skeleton jump, as prepared before the basic curriculum content.

The students' movement speed was measured during the experiment to control the training intensity. The average heart rate of students during training was 8090 times/min. In ladder training, the heart rate was 120 beats per minute, while in strength and speed training, students' average heart rate was higher than 120 / per minute. Class training required students to test themselves, and the teacher followed the training on the second training day.

Content	Group Type	N	Mean value	The value of P
50 meters	The control class	30	9.177	.037
	The experimental class	30	8.923	
Standing long jump	The control class	30	172.63	.006
	The experimental class	30	179.03	
Abdominal curl	The control class	30	35.77	.004
	The experimental class	30	40.1	
Sitting flexion	The control class	30	18.97	.014
	The experimental class	30	21.83	
800 meters	The control class	30	3.684	.002
	The experimental class	30	3.454	

**Table 2. Analysis and comparison of 5 grades in the experimental class and the control class**

As can be seen from Table 2, after the experimental group, the five results were 9.177s, 172.63cm, 35.77/min, 18.97cm, 3.684min, and the five results in the experimental group were 8.923s, 179.03cm, 40.1/Min, 21.83 cm, 3.454min. The results of the experimental class were higher than that of the control group, and the five results P was less than 0.05. The long jump and sit-ups had significantly higher differences. The results show a marked improvement in the experimental class compared with the control class. In the experimental group, all aspects of physical training were beneficial to 50m, standing long jump, sit-ups, seat bending, and 800m improved, which shows that computer-assisted virtual reality technology has a very good role in promoting the comprehensive level of students' sports.

## 5. Conclusions

Computer virtual technology combines sports training with sports, which brings great changes to sports training. University sports training will greatly influence teaching patterns and career teaching systems. Computer virtual technology has accelerated physical training. It is important to promote the development of competitive sports. Computer virtual technology can improve the quality of college physical training equipment and improve the level of teachers' skills and other practical problems so as to improve the quality and efficiency of physical education in colleges and universities. In addition, it can also improve the level of sports skills and tactics training. It can better promote the training of Chinese sports talents, which means that computer virtual technology and sports training will be combined in future physical education in colleges and universities. These indicate that virtual reality sports is one of the major innovations in the field of sports, and

computer virtual technology plays an important role in promoting the development of sports. Because of the limited time and ability, this study still has some shortcomings. For example, due to the uneven development of sports in different areas, the results of this study may not necessarily be suitable for other areas, thus needing further research.

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