An Analysis on the Application of Virtual Reality Technology in Physical Education Teaching

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Abstract: This study adopts the method of literature, logic analysis, mainly from the computer virtual reality technology in sports teaching the fusion path, the application of technical challenges, as well as about VR technology used in the sports teaching discipline theory problems of these three aspects. Studies suggest that VR technology can from the following three paths into sports class: (1) the virtual teaching and traditional teaching of harmony, (2) virtual teaching and practical teaching organic combination, (3) the virtual teaching and sports "educational" mission combination; Challenges mainly reflects on the problem of VR technology, one of the biggest disadvantages is that movement experience loss of authenticity; From the point of subject theory, VR technology is just effective auxiliary tool of the physical education teaching, cannot replace in the sense of "body cognitive" teaching.

Keywords: Virtual Reality Technology; Virtual Teaching; Sports; Physical Education

1. The cause of the research

In March 2019, the Ministry of Education issued "education informationization and network security priorities for 2019," the document stresses that the push to big data, such as virtual reality, artificial intelligence technology in the application of the education teaching. Then a sudden new virus worldwide, physical education in China has launched an unprecedented large-scale online education practice, online teaching has become a hot topic. Due to the traditional single video network teaching is difficult to meet the needs of physical education curriculum, so the computer Virtual Reality technology, Virtual Reality, hereinafter referred to as the "VR technology") has entered people's field of vision. Using China National Knowledge Infrastructure (www. cnki.net), which will retrieve conditions limit theme of "virtual reality", retrieval scope limited to "sport", statistical results a total of 324 articles (retrieving date on November 6, 2020), among them, the first paper is published by the Chinese scholars Guangyun Meng in 1995. Chinese scholars to the virtual reality technology in sports teaching research started relatively late, the main research results are mostly concentrated in the published after 2010. After preliminary generalization, found that the contents of these documents are divided into the following three categories: 1) about the introduction of VR technology. Mainly on the discussion of the concept and connotation of VR technology, also to the VR technology in sports training, sports teaching, sports broadcast application are introduced and described.2) research on sports teaching and training practice, focus on areas of begin to pay close attention to a particular sport. Combine with teaching ways, among them, the VR technique research mainly focus on the football, gymnastics, martial arts, and volleyball project, and in areas such as soccer, martial arts and calisthenics have carried on the auxiliary teaching practice research, especially VR technology in football teaching of the project, there are more fruitful results. Overall, VR technology combined with physical education teaching research from the content and depth also slightly shallow, lack of strong longitudinal empirical research. 3) about VR technology used in the value of physical education teaching, the researchers also the concrete application of the virtual teaching aspects has carried on the empirical research, found that VR technology in dancing, tennis, shot put, etc., which has great help to stimulate students' interest in learning. But look from the conclusion, slightly shallow depth of the study, not real depth analysis of its advantages and disadvantages from the theory.

Based on previous studies of small defects, this research will have on the VR technology can be applied in the sports teaching, and how to reasonable application, where discipline theory basis for discrimination.

2. Definition of VR technology

VR (Virtual Reality) is a word, in the domestic most often translated as "Virtual Reality", this seemingly contradictory rhetoric words, is hot topic of science and technology and education field in recent years. Its application field and cross areas, almost to the point of everything, including the field of industrial production, medicine, entertainment, arts and cultural heritage field, education field, and many other fields[1].

Definition of VR technology, the researchers give explained from different angles, in order to make people more simple and clear understanding of VR technology, I of VR technology are defined as follows: VR technology is the use of computer science and technology related with the combination, to build a virtual 3 d environment, in order to "cheat" human body awareness, let people

experience the consistent with the real environment perception of technology.

3. Application of VR technology in physical education

Application in the field of VR technology in sports in our country at present, the main focus in terms of live events, in the development of the sports teaching is still relatively slow[2].

2003 Chinese scholars Wei Xiao in the article, the brief analysis of the physical education curriculum of the application of network technology in remote education, he believes that physical distance education in the teaching get rid of the barriers of time and space, but there are also many limitations, mainly reflected in the network transmission speed and popularity[3]. For a specific research on sports teaching.2010 Chinese scholar Kuncheng Chen city this paper expounds the application of virtual reality technology in volleyball teaching and training, and the simulation of the volleyball technique and tactics design reference opinions are put forward[4]. In 2018, Chinese scholars Ruifang Shao adopted experimental method, taking Hangzhou Normal University students majoring in sport as participants, and applying VR technology in the teaching of the professional sports students' skill, including golf, track and field, wushu three sports. The research results show that the VR technology used in golf, track and field, wushu, is good for improving the students' interest in learning, the ability of independent inquiry learning, as well as the special physical and technology[5]. Then, in badminton, sports dance, table tennis and other sports, scholars have also conducted VR: an empirical study of the classroom.

Overall, the application of VR technology in the sports teaching is a kind of trend, but the VR technology in the sports teaching practice research also slightly shallow, experimental research and the lack of a case-control study, unrealized VR technology and the depth of the physical education class teaching.

4. VR technology and the fusion of sports teaching path

The application of VR technology in physical education is unstoppable, and the development and research of related software is also proceeding in an orderly manner. The application of VR technology in sports teaching, expand the current teaching methods, optimize the student's learning path, stimulated the students' interest in learning, let the students to better grasp the sports skill, in training students' aesthetic ability plays a subtle role, in order to achieve the comprehensive development of students provided a powerful support[6]. Analyze the fusion path of VR technology and physical education teaching is helpful to improve teaching efficiency and teaching quality, realize the leap development of sports discipline.

4.1 The virtual teaching and traditional teaching of harmony

This new form of sports teaching by students in the preliminary practice of love, but in the early stage of development, the virtual teaching must be fully absorbing excellent traditional sports teaching experience, the essence, discard the dregs, to good traditional teaching mode to fully mix to the virtual teaching, achieve the combination of virtual and reality[7]. Traditional sports teaching. Theory class daunted, simple demonstration, the interpretation of practical class is difficult to meet the needs of the students' learning. Traditional sports teaching. The cramming-style teaching of educational theory courses and the simple demonstration of practical courses can hardly meet the needs of students. Use the method of virtual reality, to present the theory and technique and tactics, can better assist teachers to complete teaching[8]. For example, in the sports anatomy, sports biomechanics, and other theoretical strong on the classroom teaching, can make use of VR technology allows students a full range of observation, a bone or more image observed pedal foot Angle and the range of the swinging leg with the ground, the original abstract, obscure theory knowledge into vivid three-dimensional imaging. In the skill practice class, VR technology is used to explain the technology and tactics, so that students can grasp the situation as a whole and better understand the practical application and other issues.

4.2 The organic combination of the virtual teaching and practical teaching

According to the characteristics of the virtual teaching and the characteristics of sports discipline itself in harmony. Virtual is "virtual" after all, therefore, need to combine virtual and reality, if can undertake teaching reality, as far as possible don't virtual teaching, return to nature. Sports discipline is a "move" discipline, has strong practicality and its own particularity. According to the characteristics of PE course, the virtual teaching must be combined with the actual teaching, according to actual teaching situation right amount increase or decrease in the application of virtual technology in the teaching, VR technology is a kind of auxiliary means, eventually have to return to the "nature" of sports. Such as auxiliary in the virtual teaching environment after the students master the skill movements of good individual, must return to the actual movement of feelings, which in turn is in reality the reserves of knowledge into practical ability.

4.3 The combination of virtual teaching and sports "educational" mission

Sports as a discipline of education of people, in the process of teaching should be closely linked the mission of "education". If the virtual teaching cannot merge with the depth of the mission, there is no future, no vitality. Sports classroom condensing all sorts of "truth, kindness and beauty", in the process of sports teaching, in addition to the emphasis on skill learning, to cultivate students' cultural quality of physical education curriculum. Virtual teaching as a teaching means, must be combined with the attributes in the nature of physical education curriculum, to achieve "and repairing of body and mind, soul and cast" effect. Therefore, the future development of VR technology in sports teaching process, the need to consider these factors.

5. In the sports teaching the application of virtual teaching challenge

VR technology as a new technology, if can reasonable application in the process of sports teaching, must have many advantages, but in its development and application in the process of sports teaching, there are still many technology and the discipline theory problem.

5.1 Virtual teaching in physical education teaching in the process of the existing technical challenges

First, the transmission problem. VR live is big rate transmission, but at present domestic average bandwidth speed did not reach

4 k live streaming broadband transmission level[9]. Although at present, China's per capita broadband speed efficiency is not high, but with the continuous development of 5 g technology and the comprehensive popularization, the problem will be solved.

Second, the vision problems. VR display device to produce visual signals does not include the human visual system detected outside the scope of the artifact. As people say, "corner" of the eyes not well, just in the sports technique and tactics teaching, often need to use peripheral vision to detect the external environment. The bigger problem is that not everyone the same visual field, therefore, immersive experience will be affected, which in turn causes the discomfort of the body. And the stability of the VR footage is poorer, movement will bring people vertigo, a low resolution of VR filming equipment at the same time, resulting in poor user experience[10].

Third, equipment wear experience problem. VR technology requires a lot of data transmission and processing, and the current wireless technology cannot achieve the real-time display technology is very high, so the equipment connected to the human body the cable very much, in addition to wear in the body of the equipment quality is bigger, drop pressure equipment will also greatly reduce the user's experience[11]. At the same time, these expensive external devices, whether high resolution of helmet mounted display, or high precision data glove, most still stays at the locality of the force feedback level, at present can't well meet the needs of students in the process of sports teaching experience.

The VR technology in the developing process, must have failed to solve many technical problems. But with the deepening of the study, 5 g technology, AR technology, artificial intelligence, computer etc. The core technology of continuous development and improvement, solve the technical problems existing in the VR technology will a piece of cake. Therefore, consider applying VR technology in the sports teaching, or use in education activities, consider discipline theory problem also is very important.

5.2 Virtual teaching combined with physical education teaching, discipline theoretical challenge

Virtual teaching for a better development, must be closely integrated with the "education", so must seek the support of the education theory will show gave birth to the restless vitality. The application of virtual teaching in sports discipline, too, must be combined with the characteristics of sports discipline, clear the mission of "education", to play its role. But sports discipline has its particularity, in the mode of cognition, emphasize more on body sexual cognition is given priority to, so in the sports teaching the application of virtual teaching there is a tremendous amount of discipline theoretical challenge.

First, it is difficult to truly show cognitive experience completely, causing the loss of information. There are three ways for humans to understand the world: conceptual cognition, image cognition and body cognition. The "body cognition" is not physics, anatomical cold, lifeless "body", it is the movement, with feeling is permeated with the breath of life "body"[12]. The virtual teaching is the core technology of using the computer fixed "program", tend to cause some undiscovered information loss. At present, the application of VR technology in physical education only stays at the level of local physical perception, which cannot meet the needs of students in the process of physical education experience. Movement in the process of the body, not just a part of body awareness, but the overall feel of the body, is the whole people to participate in the movement of learning, understanding the process of the world. As a poem "plunges three thousand feet, suspected galaxy nine days", not to "fly", "flow", "straight"...Simply cut down the word by word to understand, so also can't understand, can only from the whole to grasp.

Second, the one-way communication, which is difficult to generate emotional resonance. Physical education teaching, must be have the teacher's teaching, students' learning, but the computer virtual teaching, no the real-time guidance teacher, the teacher can't see the student, only for single machine communication, can cause many problems. Experience such as martial arts movements, not between the students and teachers or students and students of physical contact, will only stay on the level of the "form". Sports has its particularity, and literature, history, philosophy, the conceptual and abstract knowledge have very big difference. Such as tourism, is more than just visual stimulation, people in the real world will resonate with the local folk customs, and local residents of the local cultural and ideological exchange.

Third, the cold mechanical education, lost "personality" education, is a deviation from the education mission. Sports teaching is not the biological renovation to the person, it is not in the simple "exercise" or "transform" human body, it cannot simply use a variety of physiological indexes evaluation. Sports should not be kept from the height of the "anthropology" demoted to the level of the "biology" to talk about. Such as, the 100 - meter run on the treadmill, despite the fact that in various physiological indicators and the effect of the physical education class ran 100 meters is the same, but on a treadmill run one hundred meters, equivalent to the real physical teaching run one hundred meters? The answer is definitely no, because of physical education and other subjects teaching, as its primary task is to education students. Sports education is not to train "limbs" developed, simple deformity, the one, but a true and comprehensive "holistic" education[12]. And this kind of holistic education, virtual reality of mechanical education is never reached.

6. Conclusion

In the sports teaching the application of VR technology is the trend of The Times, is also the objective requirement of The Times development. On the one hand, the virtual teaching has many advantages, but also has a lot of insufficient place, to correctly understand the pros and cons. VR technology as an auxiliary tool of sports teaching, must grasp the scale of the application of reasonable, cannot blindly pursue sports scores, the improvement of learning efficiency, or some physiological index, blindly use virtual teaching. Virtual teaching, on the other hand, to better serve the sports teaching, cannot be made as to the teaching form of islanding must be closely integrated with the "education", to avoid deviation from the direction of the education, can be called a true and 'holistic' education.

Finally, the VR technology in the sports teaching or in the education application, have to delve into sports discipline theory or the support of education theory, for the development of VR technology in the future to better serve the education career.

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