Research on the strategy of improving sports skills in colleges and universities from the perspective of virtual reality

Shengqi Wang[1,2,*], and *Mohamad Nizam Bin* Nazarudin[1]

[1]Faculty of Psychology and Education, University Malaysia Sabah, 88400, Kota Kinabalu Sabah Malaysia
[2]Department of Physical Education, Xianyang Normal University, Xianyang City, 712000, China

Abstract. With the rapid development of virtual reality technology, the field of physical education in colleges and universities has gradually focused on the development of the organic integration of virtual reality technology and sports skills. Aiming at the limitations of this field and the practical needs of college sports technology difficulty, this paper investigates the basic situation of the application of virtual reality technology in sports skills teaching in 7 colleges and universities in Shaanxi, China by means of questionnaire survey and statistical analysis. The actual demand of virtual reality technology in college sports skills, college sports students' motivation to participate in virtual reality technology, use experience and demand sports items are statistically analyzed. Finally, in view of the challenges of using virtual reality technology in college sports skills, reasonable strategies are put forward, aiming to provide more effective and interesting auxiliary teaching methods for college sports technology teaching.

Keywords: Virtual reality, College sports, Sports skills, Teaching strategies.

1 Introduction

With the rapid development of global 5G technology, artificial intelligence, big data and other information technologies, the world has gradually accelerated the layout of high-tech industrialization. The technological applications of cloud computing, artificial intelligence, and virtual reality (VR) have also entered the public eye accordingly[1].And virtual reality technology is gradually active in many fields such as medicine, aerospace, industry, games, education and so on because of its uniqueness. With the improvement of the performance of hardware equipment, virtual reality technology is gradually applied in the field of education and teaching. In the field of sports, virtual reality technology can connect students and terminal equipment through computers to communicate and learn sports technology. The traditional learning of sports technology in colleges and universities can only be completed

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* Corresponding author: shengqiwang1986@sina.com

by teachers' explanation and demonstration, and students can watch it with the naked eye. However, virtual reality technology can effectively improve the learning environment of sports skills and assist the in-depth learning of sports skills. Virtual reality technology includes multiple sets of equipment, and can also use virtual reality technology to detect learners' precise control of body movements and physical state. Through the analysis of specific application research and students' feedback, it is shown that the virtual reality system is effective in physical education, and can provide students with a reliable development of physical education learning technology guidance.

2 Research objects and methods

2.1 Research object

For the sports technology in colleges and universities, we have selected 7 colleges and universities with prominent sports majors in Shaanxi, China: Shaanxi Normal University, Xi'an Institute of Physical Education, Yan'an University, Shaanxi University of Science and Technology, Tibet University for Nationalities, Baoji College of Arts and Sciences, and Xianyang Normal University.A total of 800 questionnaires were distributed, of which Xi'an Institute of Physical Education is a professional sports college, 200 questionnaires were distributed, and 100 questionnaires were distributed to other colleges and universities. Finally, 739 questionnaires were recovered, of which 95 were recovered from Shaanxi Normal University, 189 from Xi'an Institute of Physical Education, and 93 from Yan'an University. , 89 from Shaanxi University of Science and Technology, 88 from Tibet Nationalities University, 91 from Baoji College of Arts and Sciences, and 94 from Xianyang Normal University.

2.2 Research method

This study mainly used literature research method, questionnaire survey method, statistical analysis method and other research methods.

2.2.1 Literature research

In the early stage, I read a large number of domestic and foreign materials about virtual reality technology in education and teaching, especially related literature related to physical education. Analyze the feasibility of the application of virtual reality technology in college sports skills, and find a modeling and analysis platform for establishing related virtual reality technology for sports skills. It systematically summarizes and sorts out the research on the status quo of the application of virtual reality technology in physical education in various countries, so as to carry out accurate extraction and in-depth analysis.

2.2.2 Questionnaire survey method

Through investigation and analysis, the "University Sports Virtual Reality Technology Questionnaire" was formulated. In order to ensure the reliability of this questionnaire, the Cronbach coefficient method was used to test the combined reliability of the questionnaire. The test results showed that the Cronbach's coefficient was greater than 0.5, which met the reliability requirements. The questionnaire was sent to 6 professors and experts in education

and physical education in Xi'an Institute of Physical Education for identification and evaluation. Based on their feedback, the questionnaire was supplemented and improved.

2.2.3 Mathematical Statistics

Statistical analysis software such as SPSS was used for relevant data analysis.

3 Results and analysis

3.1 The real demand for virtual reality in college sports skills courses

The teaching of physical skills is an important part of physical education, which helps students to fully grasp the essentials and difficult techniques of physical education [2]. The problem is that the technical imitation is relatively rough, and the essence of the technology cannot be grasped. Due to the rapid movements of some techniques and the difficulty of demonstration, students did not see the specific details of the movements or even the force point of the movements. For example, in the technical movements of gymnastics, there are actual facts that the movements are fast, difficult, and cannot be seen clearly, which makes students feel ambiguous and psychologically afraid of gymnastics movements[3].Instep kicking and outside instep kicking in football techniques, the kicker's stance, the angle of kicking, the timing of kicking, the tactical application in badminton, the movement of steps and the technique of putting the ball in front of the net, the strength of the wrist , the angle and the specific position of the action, the action is quite fine, then the virtual reality technology plays a huge auxiliary role. In recent years, the rapid development of virtual reality technology has also made great breakthroughs in the field of physical education, which can create a "self-learning" teaching environment for students [4]. From the traditional learning method based on teaching demonstration to a new learning method in which learners can obtain the required knowledge and skills through the interaction between themselves and auxiliary information equipment. This has greatly improved the difficulty of teachers' lack of demonstration and unclear explanations, and has also greatly alleviated the problem of lack of equipment and physical education teachers in some projects. Teaching is more diversified, greatly improving teaching efficiency.

3.2 Questionnaire survey analysis

3.2.1The use motivation of the interviewed students

The motivation of using virtual reality for college sports skills students can be roughly divided into several categories, as shown in Table 1.The number of students who use virtual reality technology to assist in mastering sports skills accounted for 98.9%, and the number of students who improve their learning confidence accounted for 98.1%. There is not much difference between the two motivations, which reflects that some sports technologies are relatively complex and students cannot immediately to master the essentials, virtual reality technology is needed to assist in analyzing learning actions, and the analysis of technology through virtual reality can improve learning confidence. Secondly, the use of virtual reality technology to improve the interest in skills learning skills accounted for 87.9%, which also reflects the boring state of learning some sports technical skills. With the assistance of virtual reality technology, it can stimulate students' interest in learning and conduct effective learning. Self-directed learning accounts for 95.4%. Virtual reality technology

simulates the real teaching environment, and simulates students' classrooms through action explanation and voice interaction. Students can learn independently, and this kind of learning ideology is high. The proportion of entertainment is only 2.2%. It can be seen that there are not many people who use virtual reality technology for pure entertainment. They are all to facilitate the rapid learning of sports skills.

Table 1. Motivation of college students using virtual reality skills.

Motivation to use	number of people	Proportion/%
Assist in mastering physical skills	731	98.9
Increase interest in study skills	650	87.9
Improve learning confidence	725	98.1
Self-learning	705	95.4
entertainment	16	2.2

3.2.2 Analysis of learners' experience of using virtual reality technology

After college students use virtual reality equipment to assist in learning physical skills teaching, they have a deep feeling. It can be clearly seen from the survey data of users' interviews that learners have a very high evaluation of the role of virtual reality interactive equipment, and the data is uniform at 95%. The above is enough to show that college students are very willing to accept the help of new technologies. Virtual reality technology can help students effectively improve their ability to learn skills, as shown in Table 2, among which 97.6% are good interaction effects, 95.4% are accurate action simulation, 97.3% are refined action decomposition, 96.5% are excellent performance, and 96.5% are physical detection indicators. The outstanding performance occupies 96.8%, and the deep learning ability improvement occupies 95.8%, which basically achieves the ideal effect of learning user-assisted learning.

Table 2. Analysis of the effect of respondents on the real experience of virtual reality technology.

Action analysis	Number of people	Proportion/%
good interaction	721	97.6
Accurate action simulation	705	95.4
Action decomposition and refinement	719	97.3
Excellent performance	713	96.5
Body detection indicators are outstanding	715	96.8
Deep learning capabilities improved	708	95.8

3.2.3 Expected situation of college students using virtual reality technology projects

According to the questionnaire survey, the categories of projects that college students feel the need to use virtual reality technology are shown in Table 3.Gymnastics has the highest proportion, accounting for 98.1%, followed by sports dance, accounting for 95.5%. These two are relatively difficult skills in the classification of sports, followed by tennis. 94.5%, boxing accounts for 92.4%, tennis moves are slow to learn, and it is relatively difficult to learn, boxing ground fights, locking movements are ever-changing, complex and changeable, and need the assistance of virtual reality technology. Next is the shooting category, which accounts for 87.4%, and the badminton category, which accounts for 85.8%. Shooting techniques, essentials of action, angle of force, and psychological

adjustment all require patient learning and assistance, and badminton's movement, angle, and techniques also require fine-tuning learning and adjustment. Football accounts for 80.1% and basketball accounts for 78.5%. There is little difference between these two. In the end, table tennis accounts for 75.9%, which is related to China's national conditions. Actions are more profound.

Table 3. Psychological expectations of sports events using virtual reality technology.

Category	Number of people	Proportion/%
Gymnastics	725	98.1
Sport dancing	706	95.5
Basketball	580	78.5
Football	592	80.1
Badminton	634	85.8
Tennis	698	94.5
Pingpong	561	75.9
Shooting class	646	87.4
Boxing	683	92.4

2.3 Challenges of virtual reality technology in the teaching of physical education skills in colleges and universities

At this stage, the introduction of virtual reality technology in college sports skills courses has achieved certain results, but on the whole, there are still many problems to be solved in the integration of virtual reality technology and sports technology [5].

2.3.1 Insufficient virtual reality technology equipment

Virtual reality technology relies on computer equipment and auxiliary equipment to exist, and requires a lot of investment, equipment and technology [6]. On the whole, investing a lot of money to buy expensive virtual reality technology equipment is expensive, leaving a lot of pressure on colleges and universities, especially the virtual reality technology equipment allocated to sports is even more pitiful, and there is no guarantee that everyone will get the equipment. , making some students unable to obtain teaching aids effectively and unable to understand the essence of sports technical movements in time.

2.3.2 The transition between virtual reality technology and traditional teaching mode is difficult

The teaching of physical skills has always been taught in the traditional mode. The introduction of virtual reality technology in physical education in colleges and universities is still relatively avant-garde [7]. It allows students to experience the complete method of technology in a realistic environment, carefully observe the key points and difficulties of technology, and stimulate students to practice. However, due to the influence of many factors, the use of virtual reality technology as an auxiliary link in skills teaching in an imperfect virtual teaching environment cannot be applied on a large scale, nor can it replace the traditional teaching by teachers. In the process of collision between real technology and traditional physical education teaching mode, we should find an effective integration point of the two to better create a perfect virtual reality learning operation platform for students, so that students can truly appreciate the charm of science and technology and experience it

personally. To the authenticity of virtual reality, better improve the ability of sports practice.

2.3.3 Lack of talents in sports using virtual reality technology

Although virtual reality technology has been around for decades, its application in higher education is still short, and the requirements for the users of virtual reality technology are very high. At present, the physical education teachers in colleges and universities are familiar with the practical operation of physical education in their majors, but they are at a loss for virtual reality technology and cannot well integrate virtual reality technology into the existing physical education technology teaching. However, developers with proficient virtual reality technology cannot develop and design a virtual reality practical operating environment suitable for students according to the characteristics of colleges and universities and the needs of students, but they do not have physical skills, let alone add technical teaching experience to virtual reality [8]. It seriously hinders the implementation of virtual reality technology in physical education in colleges and universities.

2.4 Strategies to improve the use of virtual reality in physical skills courses in colleges and universities

(i) The reform of colleges and universities requires the cooperation of various departments, continuously exerting the strength of the school and society, increasing capital investment, purchasing advanced virtual reality technology equipment, and creating a perfect virtual reality technology practice teaching platform for students.

(ii) Change the concept, actively explore new technologies with the attitude of scientific development, establish a high-reduction virtual practice environment for students, and realize the deep integration of virtual reality technology and traditional physical education teaching mode.

(iii) Improve the construction of virtual reality technology teachers in colleges and universities. Teachers should establish a correct educational concept, actively face new technologies, and on the premise of updating their professional knowledge, arm themselves with virtual reality technology to make themselves more combat effective, so as to better serve students.

3 Conclusion

(i)Virtual reality technology has considerable advantages in physical skills courses in colleges and universities. It is known from the survey that 98.9% of students really need the auxiliary functions of virtual reality technology, and 98.1% of students believe that virtual reality technology can improve the confidence in learning physical skills. 87.9 % of students believe that virtual reality technology can improve learning interest. 95.4% of the students believe that the use of virtual reality technology can carry out independent learning.

(ii)Most students believe that gymnastics, sports dance, tennis, and boxing need the help of virtual reality technology, accounting for 98.1%, 95.5%, 94.5%, and 92.4%, respectively, accounting for more than 90%.

(iii)Physical education students in colleges and universities have a deep understanding of the use of virtual reality, and have high evaluations on indicators such as human-computer interaction effects, accurate movement simulation, refined movement

decomposition, outstanding physical indicators, and the ability to perform deep learning, accounting for more than 95%.

(iv)In order to improve the application of virtual reality in sports skills courses in colleges and universities, we should continue to focus on internal and external forces, increase capital investment, change concepts, and build a strong virtual reality teaching team.

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