Empirical Analysis on the Effect of Actual Combat Elements in Simulated Taekwondo Teaching Based on VR Technology

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Abstract. Based on the competitive, ornamental and practical features of VR technology, most students in Colleges and universities choose Taekwondo Courses because they want to learn some practical fighting skills through Taekwondo Courses, constantly improve their own accomplishments, and advance to higher levels and sections. At present, the teaching contents of Taekwondo Courses in Colleges and universities are guided by WTF competitive Taekwondo, and the teaching contents are compiled according to the technical specifications and competition rules of WTF Taiwan Association. The teaching mainly focuses on the teaching of competitive Taekwondo technology and character, and its content has certain limitations. It can not fully meet the students' expectations of selecting courses, so that students can get the Taekwondo skills they want in class. In view of this, this paper uses the methods of literature review, investigation, interview and comparative research to analyze the teaching content of Taekwondo Courses in Colleges and universities, and to compare with TF Taekwondo technology.

Keywords: VR technology · Taekwondo teaching · Integration · TF actual combat elements

1 Introduction

Among the three applications of visc, virtual reality is one of them, which has been developed rapidly in recent years. Virtual reality is a kind of simulation environment which can replace the real world by comprehensively using computer system and various special software and hardware. This environment is real and credible for the user's sense. Virtual reality has the characteristics of immersion, real-time and interaction, so it has been widely used in manufacturing industry. Virtual reality can realize interactive visual simulation and information exchange. It is an advanced digital man-machine interface technology.

Virtual reality, with the virtual nature beyond reality, is called the three most promising technologies in the 21st century, together with network and multimedia technology. It is changing and influencing our life. At present, the most widely used in this field is the

special workstation produced by SGI sun and other manufacturers. Image display equipment is the key peripheral device used to produce stereo vision effect. At present, the common products include light valve glasses, three-dimensional projector and helmet mounted display.

2   Related Work

The establishment of virtual scene is the core content of virtual reality technology. It is the condition of producing immersion and Realism: the scene is too simple, it will make the user feel false; and the complex and realistic scene will increase the difficulty, reduce the speed of rendering, and affect the real-time. At present, there are three main ways to construct virtual scene: 3D geometric model modeling and rendering based on computer graphics, also known as graphics based modeling and rendering, which is a traditional virtual scene construction technology; advanced modeling technology, image-based modeling and drawing technology and image-based rendering technology.

Many phenomena in nature have the characteristics of self similarity. M Andel BMT points out that the main characteristic of a fractal surface is its self similarity and steady increase. Natural terrain is likely to be a typical fractal surface. In the terrain description model established by berry and hanayca, the famous nanogram function is given:

$$E[X(x) - X(x + d)]^2 = k(d)^{2h} \tag{1}$$

And the power spectral density of the terrain profile:

$$G(w) = 2\pi k w^{-\delta} \tag{2}$$

In the above two formulas, X (x) is terrain elevation, E is statistical expectation, and H is statistical parameter describing terrain change. Formulas (1) and (2) have been widely used in geosciences. They are a classical model and are mainly used to represent Taekwondo.

3   Analysis on the Teaching Contents and Causes of Taekwondo

Taekwondo in college physical education has experienced the promotion and maturity stage, and is now in a stable stage. According to the survey of students, many students have different views on the teaching content of Taekwondo due to the influence of we media. Students no longer consider the performance attribute of Taekwondo, but pay more attention to the actual combat role of Taekwondo, This is also related to the fact that students classify taekwondo as martial arts at the beginning of course selection. In the course selection motivation, there are the plots of strengthening body and practicing martial arts to defend oneself.

At present, the teaching content of Taekwondo in Colleges and universities is mainly in accordance with the competition technical requirements of the World Taekwondo Federation, as well as the technical and action tests needed to be completed in the promotion level and stage level in Shanxi [1]. On the other hand, the teaching of Taekwondo is also

constantly reforming and enhancing the technical movements that students are willing to accept and are willing to learn, especially those high difficulty turning technology, rotating technology and flying technology. However, these high difficulty technologies not only have higher requirements for the physical quality of practitioners, but also have certain risks. With the physical requirements of zero accident management of physical education courses in Colleges and universities, No teacher is willing to take the risk of safety to teach this stunt, so Taekwondo has lost its appeal to students..

4 Simulation Analysis of Adding TF Practical Skills to Taekwondo Teaching Based on VR Technology

4.1 ITF and WTF

World Taekwondo Federation (WTF) and International Taekwondo Federation (TF) belong to different system schools of Taekwondo. The World Taekwondo Federation (WTF) was founded in Seoul in May 1973. Jin Yuncheng was elected as the president. At that time, more than 20 countries from all continents joined the organization. In 2000, the Sydney Olympic Games included taekwondo as an official competition item. The entry of WTF into the Olympic Games had a great impact on Taekwondo [2]. In 1980, the International Olympic Committee officially recognized WTF. In order to make Taekwondo develop faster and better, and provide the exchange and exchange of martial arts skills among Taekwondo practitioners, with the continuous efforts and advocacy of general Cui Hongxi, taekwondo practitioners from military to civilian have developed rapidly in South Korea, which has become an indispensable competitive event in all major competitions in South Korea. Since Taekwondo entered the Olympic Games, WTF rules have been widely spread and applied in the world through media propaganda, and practitioners have sprung up all over the world. The International Taekwondo Union (TF) was founded by general Cui Hongxi, a two-star major general of the South Korean army, in Seoul, South Korea on March 22, 1966. The name of the 24 sets of routines is called ter, which symbolizes 24 h of a day from heaven and earth to unity. The name of each group is taken from the outstanding historical figures and national heroes who have never invaded other countries in Korean history for nearly 5000 years; In terms of technology, it emphasizes the control and exertion of force to the limbs. It is allowed to use the combination of boxing and leg techniques to obtain the scoring points in the match. During the competition, the players should wear boxing and foot covers to protect the opponent and reduce the damage. ITF competition is divided into five parts: Tel, duel, stunt, power and body protection.

4.2 Analysis of the Current TF Taekwondo Teaching Content and Competition Action

Tae (TAE), which means kicking and bumping with feet, Kwon with fist and do, is an artistic principle and method. Taekwondo is an artistic method of kicking with boxing and feet. It is mainly footwork, with 70% footwork and 30% boxing. In the TF system, there are many differences between the competition requirements and WTF. First of all, in

terms of boxing, WTF only allows forward boxing, that is, PA run Ju Mok is a technique that uses the front of the clenched fist to attack the front of the opponent's trunk in a straight line with speed and power. Although the technical attack of boxing is allowed, it limits the position and method of boxing, and in the process of Taekwondo competition, few competitors use boxing to score. However, in the process of I f competition, it is quite different. In the process of competition, not only can you use the fist attack, but also can use the hand knife attack to score. Moreover, the score of the fist is the main scoring technique, and it can also hit the face, with the score ranging from 1 to 2. Secondly, in the two systems, the use requirements of leg techniques are similar, but there are great differences in the process of competition. In professional WTF competitions, such as the Olympic Games, we can hardly see fancy leg techniques. Instead, we use the advantages of height and leg length to win the competition by swinging and hitting each other's head with hook and loop as much as possible. However, in the process of TF competition, due to the more use of boxing, its ornamental value is better than that of WTF, but the intensity is different from that of WTF. By watching the competition of TF and WTF, and looking for relevant information, it can be concluded that ITF is more practical and practical than WTF [3].

4.3   Feasibility Analysis of Adding TF Techniques to VR Taekwondo Teaching

Taekwondo belongs to the same field of competitive sports, with a lot of advantages, such as large amount of physical contact exercise, in college sports elective courses have a wide range of student groups, many colleges and universities Taekwondo elective courses are full of thought, due to the strength of teachers and venues, finally have to through flexibility and flexibility and other special qualities will return some students, let them choose other special subjects. Therefore, it can be seen that Taekwondo elective course in Colleges and universities has a mature foundation. In Colleges and universities, physical education courses are usually offered in freshmen and grades. Different colleges and universities have different requirements [3, 4]. However, in order to maintain the continuity of physical education courses, most colleges and universities encourage students to keep the same physical education curriculum options in the first and second year. However, in recent years, due to the monotonous teaching content of WTF, students are encouraged to keep the same options, Many students have lost their interest in Taekwondo elective courses in their sophomore year, which makes it different from the freshman full situation in the process of setting up taekwondo in the second year of University. Therefore, the necessity and urgency of teaching content reform of taekwondo course are obvious. Through the author's questionnaire survey on 2017 undergraduate and 2017 graduate students of Xi'an University of Electronic Science and technology, the results show that more than 50% of the students hope that taekwondo course can increase combat skills and antagonism, which can also meet the students' motivation to choose courses, continue to keep Taekwondo Courses better carried out in Colleges and universities, and become a sports event that college students are willing to practice. It can be seen from the above that it is feasible to integrate ITF practical Taekwondo elements into college Taekwondo curriculum. The simulation software is shown in Figs. 1 and 2 [4].
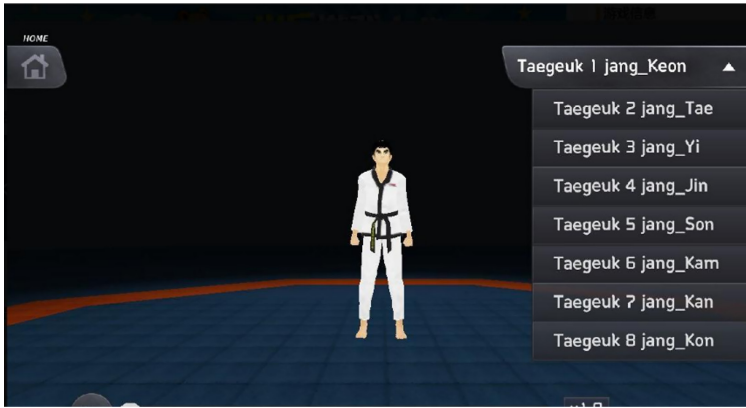
Fig. 1. Simulation software for Taekwondo with VR

Fig. 2. Simulation software for Kundo with VR

5 Research Results and Analysis

5.1 Significance of Training Students in Taekwondo Teaching of Physical Education Major

In order to study the major of physical education, we should have some understanding of its connotation. In 1988, the State Education Commission put forward in the "explanation of the revision of the catalogue of PE Majors in national colleges and universities": the division of majors should be based on the discipline system, with due consideration given to the work needs of the business departments, each major must have its own theoretical system and Curriculum system, and the professional direction and business scope should be obviously different from other majors [5]. Since the National Education Commission changed the original "physical education major" to "physical education major" in 1988, it has put more emphasis on the normal nature of physical education major. From the relative independence of Physical Education (in a broad sense) and the normal requirements of physical education major, physical education major has two attributes of "physical education" and "education". Therefore, how to deal with

the relationship between the two is the physical education curriculum reform must be considered. The training goal of physical education major is to cultivate high-quality comprehensive talents, not only to learn knowledge, but also to know how to apply it, so as to achieve the purpose of teaching and educating people. From the perspective of physical education specialty, physical education specialty itself is comprehensive. It is not only a physical education specialty, but also a normal education specialty of higher education. In essence, physical education belongs to the normal major, and its normal nature is reflected by "professional" courses, and it is the requirement of the times to reflect a certain degree of comprehensiveness in professional courses and professional basic courses. Students majoring in physical education are responsible for teaching and educating people. It is the goal of the school to set up reserve talents for the development of physical education. To cultivate students majoring in physical education is to transmit physical education work to the society, spread all kinds of sports activities, and let people know and understand all kinds of sports [6].

5.2 Characteristics of Taekwondo

Taekwondo belongs to an open, multiple variation combination of action technology structure, is a "fast" to win, to "smart" to win the sport. The uncertain factors often appear in the competition, so in the actual competition, any action of the athletes will be constantly interfered by the opponents and fierce confrontation, which runs through the struggle of restriction and anti restriction, exertion and anti exertion [7]. The unpredictable factors always surround both sides of the competition, and the technical actions are difficult to implement according to the usual training program, we must constantly adjust our technical actions according to the changes of the situation on the spot, and take appropriate countermeasures and action methods [8]. In other words, in a real competition, technical elements include: vision, body center of gravity, sense of distance, timing, judgment, speed, hitting strength and adaptability. Taekwondo belongs to the category of fighting events. In terms of its technical essence, its purpose and function is to attack the opponent without being attacked, or to resolve the opponent's attack and counterattack. As far as its function is concerned, taekwondo technology is mainly divided into seven parts: attack technology, counterattack technology, defense technology, connection technology, fake action technology, combination technology and comprehensive technology. Taekwondo competition is a comprehensive competition project of intelligence, physical strength, technology, skill and will quality of both sides of the fighters, which has a high degree of actual combat and fierce antagonism. In the application process of Taekwondo technology, only to grasp its inherent laws and characteristics, is the premise of success [9]. From the movement structure and characteristics of Taekwondo, whether it is attack or defense, the basic elements of its movement are nothing more than the point, line, distance and speed, weight, accuracy in attack and slow, stable and flexible in defense. Only by paying attention to these basic elements and applying them to the practice of training can we achieve the goal of conquering the enemy. We should see that: action is controlled by consciousness, to act according to circumstances, we must have conscious control, otherwise, any action we want to implement is impossible. Therefore, consciousness forerunner becomes the connotation and core of technical action. It includes observation, judgment, foresight and special sense and perception of

Taekwondo (sense of foot, sense of distance, sense of opportunity, sense of space, sense of rhythm, etc.) [10].

5.3 Moral Cultivation for the Body, Etiquette for the Use

Taekwondo sports through physical practice and training to achieve self-cultivation, improve the noble purpose of personality [11]. Physical behavior is the external performance, and its connotation is not only the skills and skills of Taekwondo, but also the reflection of people's inner world, including emotion, sentiment, behavior and quality. The teaching and training of Taekwondo is not only a process of strengthening the body and cultivating certain self-defense skills, but also an effective means of cultivating Tao's sentiment and noble moral character. As a taekwondo Professor, he should not only "teach" and "solve doubts", but also "preach"; he should not only have a good professional and technical level, but also strictly require himself in the code of conduct and be a model for students; he should be a good teacher and a good friend to create a harmonious and lively teaching environment, in the process of imperceptibly cultivating and improving students' good moral quality and indomitable fighting spirit [12].

6 The Role of Multiple Intelligences in Taekwondo Teaching of Physical Education Major

Traditional Taekwondo Teaching exaggerates the role of sports intelligence and overemphasizes the importance of double Basics (basic knowledge and basic skills). According to Gardner's multiple intelligences, it is necessary to re integrate the teaching content of Taekwondo to connect it with more intelligence. From the perspective of the essential attribute of Taekwondo sports technology, we can think that taekwondo course belongs to skill learning courses, belongs to the field of physical cognition; at the same time, most of Taekwondo learning is completed in the practice of mutual cooperation between students, which needs the interaction between people. To sum up, it can be concluded that the nature of taekwondo course is a practical course based on competitiveness and multiple intelligences, which makes it necessary and feasible to use multiple intelligences to realize the diversified construction of taekwondo course. In physical education teaching, taekwondo course has a very high demand on students' comprehensive intelligence. On the contrary, reasonable and effective teaching methods can help students improve their multiple intelligence levels, mainly in the following four aspects [13].

(1) Sports intelligence, taekwondo and other sports technology, as long as we provide students with reasonable teaching means, promote students to practice effectively, we can improve students' physical ability to a certain extent. (2) Space intelligence, taekwondo technology, in addition to a single technical action, more is the effective completion of the combination action, especially in the actual competition process, athletes need to make judgments at any time, control the body space feeling. (3) Interpersonal intelligence, taekwondo most of the technical action learning needs to be done in pairs or even more people with practice, so the cultivation of students' interpersonal intelligence is indispensable. (4) Self cognitive intelligence, after a day of hard training or the end of a game, the teacher asked the students to make training notes or summary of the game,

record their own feelings, analyze the key to success or failure, and formulate further goals. This link focuses on training the students' self cognitive intelligence. Therefore, Taekwondo Teaching is not only a project that can develop students' physical and sports intelligence, but also can cultivate students' spatial intelligence, self cognitive intelligence and interpersonal intelligence. Therefore, taekwondo course can well develop students' multiple intelligences [14].
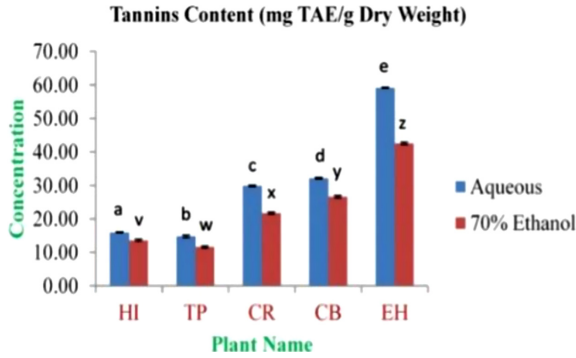
7   Teaching Design of Cultivating Students' Multiple Intelligences in Taekwondo Teaching of Physical Education Major

The traditional teaching of Taekwondo only pays attention to the improvement of students' skills and tactics, but ignores the development of students' multiple intelligences. Taekwondo itself requires students to have multiple intelligences to promote the improvement of their skills and tactics. The two complement each other. Therefore, this research is to combine Taekwondo Teaching with multiple intelligences theory, cultivate students' technical and tactical ability, improve students' multiple intelligences ability, and make students become comprehensive talents. According to the characteristics of multiple intelligences theory, scientific research theory and Taekwondo Teaching, after widely soliciting the opinions of experienced teachers, the author tries to find the connection point between the two and set the effect index of this teaching experiment [15].

Taekwondo classroom teaching is a multi sensory learning experience course, which provides students with rich learning opportunities, including visual, auditory, tactile, discussion, cooperation, reflection and other ways. Teachers should choose the best teaching strategies according to their teaching objectives. Of course, even if we choose four different teaching methods to develop students' four intelligences in Taekwondo class, it does not mean that we need to teach in four steps. Some activities are carried out separately, but some activities can happen at the same time. The following seven teaching methods are often used in the teaching of Taekwondo combined with the theory of multiple intelligences. No matter what kind of teaching method is, it will reflect the cultivation of students' one or several intelligent abilities [16]. The teaching design of cultivating students' Multiple Intelligences in Taekwondo Teaching is shown in Fig. 3.

Demonstration teaching is one of the commonly used methods in Taekwondo Teaching. It refers to the learning method that students accept technology through their own visual perception by observing the teacher's correct demonstration actions. Through the demonstration of technical movements, teachers can let students understand the structural characteristics, technical essentials and skills of the learned technical movements, and quickly establish the movement representation. The specific requirements are as follows: 1. The demonstration should be standardized and concise: teachers should ensure the quality of demonstration actions, be standardized, coordinated and fluent, and be accurate from the order of action, the track of movement to the coordination of all parts of the body. 2. The demonstration should highlight the diversity and pertinence: first, it should be based on the actual needs of students, not blind demonstration; second, it should be based on different teaching stages, teaching objectives and tasks to carry out targeted key demonstration; third, the action demonstration should be conducive to students' observation: the teacher's action demonstration should let all students see as

Fig. 3. Teaching design of cultivating students' Multiple Intelligences in Taekwondo Teaching

the criterion, Fully consider the speed, angle and other factors. 3. Demonstration teaching should be combined with explanation and enlightening students' Thinking: for new teaching technology, it can be explained first and then demonstrated, or demonstrated first and then explained, or demonstrated while explaining; at the same time, some small questions should be designed for students to answer, so as to inspire students to think about technical actions.

8   Conclusion

Compared with the traditional martial arts as a new school of martial arts system, KUNDO has been highly valued and favored by different education and teaching circles since it was introduced into China. Through the development of Taekwondo, it has continuously absorbed the cultural essence of Chinese traditional martial arts. Under the new historical development background, it has gradually become the mainstream sports in the world. The world competitive sports pattern is constantly changing. The presidents and presidents of ITF and WTF have repeatedly expressed their good wishes and have the intention of merging. This is also a great joy of Taekwondo. Through the merger, the gap brought by historical reasons can be filled, laying the foundation for the development of Taekwondo, paving the way for the historical inheritance and continuous innovation and reform of Taekwondo. Therefore, for practitioners of different Taekwondo systems, we should abandon the common sense, actively carry forward the techniques and tactics of Taekwondo, better serve the development of human sports, better guide the people to keep fit, and promote the peaceful, friendly, healthy and orderly development of all mankind.

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