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ORIGINAL

EFFECTIVENESS ASSESSMENT FOR THE APPLICATION OF VIRTUAL REALITY TECHNOLOGY IN PHYSICAL FITNESS TRAINING OF ENGINEERING STUDENTS

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ABSTRACT

With the deep integration of modern information technology and auxiliary training, virtual reality technology represented by human-computer interaction has gradually received widespread attention. In this paper, virtual reality technology is applied to the physical fitness training of college engineering students to assist teaching, so that learners in the virtual sports situation with the help of VR sensing equipment to complete a variety of sensory real-time interaction, combined with the goal of stimulating feedback mechanism to improve students' self-efficacy and interest in learning, and use practice to explore the teaching effect and potential value of the achieved not only to promote the diversified development of sports skills learning, but also to provide a reference for the application of virtual reality technology in sports. It can not only promote the diversified development of motor skills learning, but also provide reference for the application of virtual reality technology in sports. The application of virtual reality technology in the physical fitness training and teaching of college engineering students can be used as a means to stimulate the effect of the potential learning ability of the learners, in the awakening of interest in the sports situation at the same time to promote the improvement of sports skills, while the traditional classroom learners in the emotional attitude did not have a positive effect on the promotion. Secondly, it is difficult to form an effective stimulating effect in physical quality by different teaching methods. The experimental results show that the application of using virtual reality

technology to optimise engineering students' physical fitness training is significant and proves the effectiveness of the proposed method.

KEYWORDS: Virtual Reality Technology; Effectiveness Assessment; Optimisation Strategies; Technical Training; Engineering students

1. INTRODUCTION

Virtual reality technology is a computer-based simulation system that creates a virtual network area. This allows the user to be fully immersed in a three-dimensional virtual world and enables real-time interaction with many senses (Bedir & Erhan, 2021; Stone, Strafford, North, Toner, & Davids, 2018). Due to the ongoing advancements in virtual reality technology, it has increasingly integrated into our everyday lives. It has found applications in various fields such as national defense, military, and even small-scale decoration design. This technology has significantly altered people's perception of time and space, while also presenting opportunities for innovation in sports training. Virtual reality technology is being used to create a new teaching paradigm for engineering students, where they may gain information and skills by experiencing virtual situations. This confluence of technology, education, and space is a departure from conventional teaching methods. The integration of virtual reality technology in sports training is a valuable tool for advancing the modernization of sports training. It helps to define the role and future direction of sports training, facilitates the planning and execution of training programs, offers innovative ideas for training methods, and enhances the learning experience for coaches and engineering students. In the virtual environment, engineering students utilize various sensing devices to engage in real-time visual (Huang, Zhang, Liu, & Li, 2023), auditory, and tactile interaction. This allows them to acquire knowledge and construct meaning within the context of information transfer. As a result, the traditional coach-led teaching mode is transformed into a mode that fosters engineering students' independent learning ability. This new approach to teaching provides a fresh perspective for modern sports training (N. Chen, Li, & Li, 2022).

Virtual Reality (VR) is an emerging technology that uses computer-generated simulations to create a simulated environment. Users can "enter" this environment by wearing a somatosensory device connected to the computer. This device allows users to interact with objects in the simulated environment and experience a strong sense of immersion. Virtual reality technology offers users a heightened sensation of immersion via its interactive and conceptualized simulated world. Virtual reality technology is an advanced kind of human-computer interface interaction technology in the computer business. Its purpose is to provide network engagement, immersion, and imagination. Presently, virtual reality technology has produced significant advancements in facilitating people to enjoy a really realistic encounter. The

system incorporates a range of advanced technologies, including computer network technology, artificial intelligence (J. Chen, Han, Zhang, You, & Zheng, 2023; J. Chen, Li, et al., 2023), physics engines, multi-sensor technology, and computer graphics, all of which are of superior quality. The integration of virtual reality technology with sports and education is widely regarded as a ground breaking advancement in educational technology. It fosters a distinct learning atmosphere, alters conventional instructional approaches, introduces novel avenues for gaining information and skills, and cultivates a keen interest in learning. The majority of virtual sports facilities scenes generated by virtual reality technology are suggested, and the training material may be periodically updated based on the requirements of educational content, thus ensuring that education and instruction remain up-to-date. Simultaneously, virtual reality technology offers robust interaction, enabling students to get completely immersed in the virtual world and enjoy the sensation of participating in sports. Within the virtual learning environment, students have the opportunity to engage in repetitive practice until they successfully acquire the necessary abilities. The use of virtual reality technology in sports education has revolutionized conventional teaching techniques and instructional resources.

Virtual reality technology is defined by its ability to immerse users in a virtual environment, creating a sense of unity between the user and the virtual world by stimulating their senses. When the user experiences the stimulus of the virtual environment, their synchronized thought echoes, creating a feeling of psychological immersion, as if they were entering the actual world. (2) Interactivity: Interactivity pertains to the extent to which the user actively engages with and manipulates elements inside the virtual environment, and receives matching responses or feedback from the environment. Users access the virtual world, where interaction perception technology enables users to engage with the environment. When users do certain actions, the surrounding environment will react appropriately. (3) Multi-perception: Virtual reality technology has the capability to provide several modes of perception, including visual, aural, tactile, and motion perception. The existing virtual reality technology encompasses visual, aural, tactile, and motion perception as its primary sensory capabilities. (4) Conceptual: Conceptual users engage with elements in the virtual environment based on their cognitive capacity within the virtual realm, resulting in cognitive resonance and enabling users to explore scenes that do not exist in the real world. This expands the range of user cognition and facilitates the development of new concepts and understanding. (5) Autonomy: Autonomy refers to the programming and design of virtual reality technology in alignment with the physical rules governing the movement of things in reality. This ensures that items inside the virtual world are shown with realistic motion. The educational teaching and auxiliary training of sports requires a combination of theory and skills, and has high requirements for practical exercises, which requires the application of information technology that is more suitable for sports teaching (Junhua, 2023). In this paper, we want

to explore an information technology that can be used for sports training, research on existing information technology and screened out three kinds of information technology, respectively, mixed reality technology (MR), virtual reality technology (VR), augmented reality technology (AR), and virtual reality technology has the advantages of convenience, feasibility and easy to operate, compared with the mixed reality technology and augmented reality technology cost-effective, and at the same time, the hardware equipment requirements are not high, through the use of AR equipment and a computer link can be realised. The hardware equipment requirements are not high, and the operation can be realised through the use of AR equipment linked to a computer. In order to further explore the application of virtual reality technology in sports training, this study will construct a sports training assistance model based on virtual reality technology, explore the assisting effect of this model in the process of sports training, and promote it (Coughlan, Kiernan, & Arnous, 2019). The main contributions are as follows:

(1) With the penetration of information technology in the field of education, many scholars have begun to pay attention to the practical application of information technology, such as virtual reality, in the learning of physical movement skills, but there are fewer studies on the relevant empirical aspects. Therefore, based on the potential value of virtual reality technology based on physical movement, this paper explores the benefits of virtual reality technology on sports skills learning, especially to provide a certain practical basis for the innovative integration of physical education and modern science and technology.

(2) Virtual reality technology will be a very effective and cost-effective teaching method to promote the learning of sports skills and improve the quality of teaching, which can stimulate the engineering students' motivation and interest in learning, and at the same time, to a certain extent, promote the learning of sports skills towards diversified development. This paper applies virtual reality technology to sports training and teaching, which is of good practical significance to the engineering students' sports skills learning, independent learning ability and learning interest, and provides a practical basis for the reform of sports training and teaching as well as the transformation to sports informatisation.

2. Methodology

2.1 Virtual Reality Technology

To build a system that enables a person to interact with the computer in a harmonious manner (as shown in Fig. 1) and to immerse the person in the virtual environment created by the computer (as shown in Fig. 2), the hardware needs to be supported by the following types of equipment.

(1) Tracking system: Its task is to detect the position and pointing of the head, body, and hands of a person in a virtual reality system in real time and interact with the virtual environment in order to feed these data back to the control system to generate images that change with the line of sight Generally, it can be classified as electromagnetic tracking system, acoustic tracking system, and optical tracking system (Zhou & Li, 2021). (2) haptic system: is the key factor to produce "immersion" effect, the user can operate the virtual object with movable limbs, and can feel the reaction force of the object at the same time of operation, the common haptic feedback devices are mouse, space ball, and the game stick, for example, some of the data gloves, they can grasp the virtual object and measure the reaction force of the virtual object, so that the virtual object can be used for the control of the virtual environment, so as to generate the image with the line of sight. They can grasp the virtual object and measure the reaction force of the virtual object, thus realising force feedback. (3) audio system: auditory environment system consists of speech and sound synthesis equipment, speech recognition equipment and three-dimensional sound source positioning equipment, through the auditory channel to provide auxiliary information, can enhance the user's perception of the environment, so that the computer has a human auditory function. (4) Image generation system: In the system, the image generation and display technology is particularly important, which is the main part of the virtual reality system, and its goal is to generate a virtual environment for the user and realise the operation and management. (5) Visualisation display equipment: In order to display the virtual reality environment with a sense of immersion, commercial equipment is the system, there is support for high-resolution stereoscopic displays and for the helmet-type Combined with the physiological characteristics of human visual perception, the generated images were sent to the helmet display screen to produce a stereoscopic image.

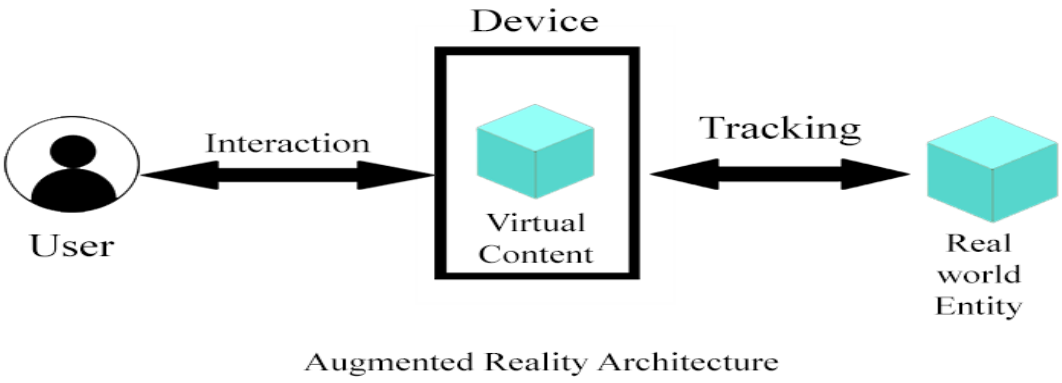

Figure 1: Schematic diagram of the augmented reality architecture.

In terms of software, in order to create an interactive, real-time, realistic virtual environment (Michalski, Szpak, & Loetscher, 2019; Miles, Pop, Watt, Lawrence, & John, 2012), there is a need for a stable software development platform and the corresponding software development tools, which helps

software developers to develop advanced products, dedicated to the development of the system's tools and software are mainly divided into two categories, one is the tool library software for professionals with programming skills, the other is the development of the environment with a graphical interface dedicated to its software.

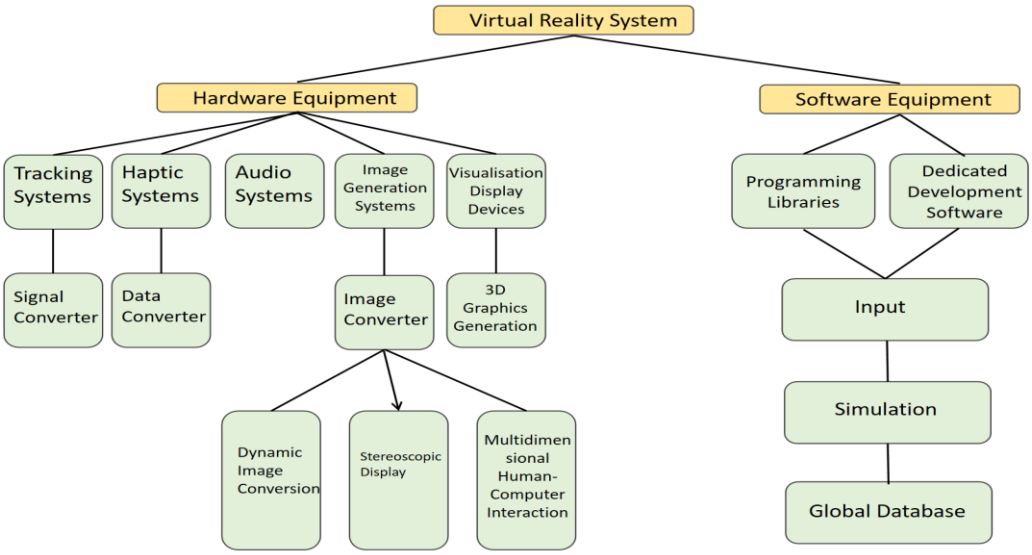

Figure 2: Schematic diagram of the structure of virtual reality system.

In virtual reality, it is often necessary to compute the 3D coordinate system, which exists in three axes, the x-axis, the y-axis and the z-axis, as shown in Figure 3.

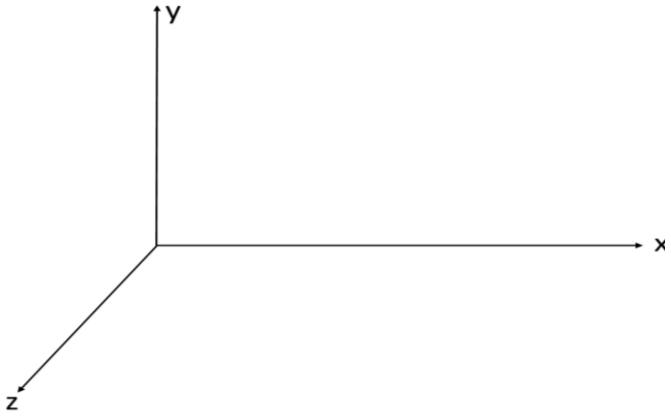

Figure 3: Schematic diagram of the left-hand coordinate system.

Screen coordinates are the coordinates set for the screen with the current computer screen, it is the upper right corner of the point in pixels, the position of the z-axis is determined by the camera's viewpoint, through the camera in order to see the objects in the virtual world. In the 3D engine, the fork multiplication is used to determine whether a character is turning clockwise or anti-clockwise, as shown in Figure 4.

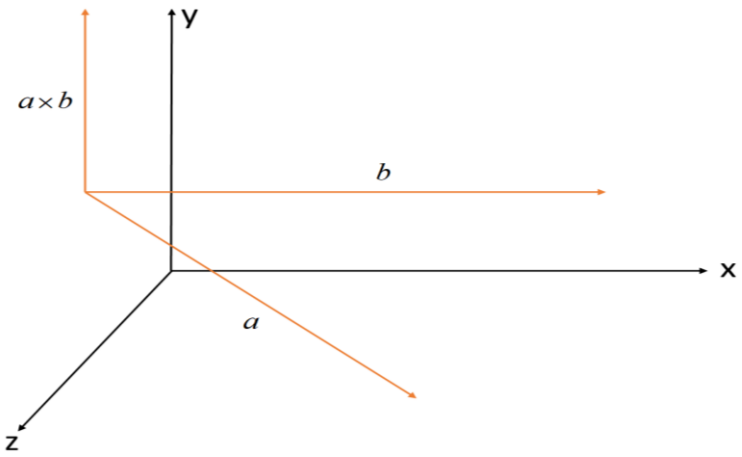

Figure 4: Schematic diagram of cross product of vectors.

In 3D space, to move an object from one position to another, the translation matrix operation is performed at the bottom of the engine. The relationship between the two objects can be calculated using the following mathematical equations:

$$\begin{cases} x' = x + T_x \\ y' = y + T_y \\ z' = z + T_z \end{cases} \quad (1)$$

According to the above equation we can express them as a matrix:

$$[x', y', z', 1] = [x, y, z, 1] = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ T_x & T_y & T_z & 1 \end{bmatrix} \quad (2)$$

The scaling of an object can also be calculated by the following equation, which is defined as:

$$\begin{cases} x' = x * S_x \\ y' = y * S_y \\ z' = z * S_z \end{cases} \quad (3)$$

According to the above equation we can express them as a matrix:

$$s(x, y, z) = \begin{bmatrix} S_x & 0 & 0 & 0 \\ 0 & S_y & 0 & 0 \\ 0 & 0 & S_z & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \quad (4)$$

In addition, object rotation can be achieved through matrix rotation. The calculation equation of the matrix rotating around the x-axis is as follows:

$$R(x)=\begin{bmatrix}1 & 0 & 0\\ 0 & \cos\alpha & \sin\alpha\\ 0 & -\sin\alpha & \cos\alpha\end{bmatrix} \quad (5)$$

The calculation equation of the matrix rotating around the y-axis is as follows:

$$R(y)=\begin{bmatrix}\cos\alpha & 0 & \sin\alpha\\ 0 & 1 & 0\\ -\sin\alpha & 0 & \cos\alpha\end{bmatrix} \quad (6)$$

The calculation equation of the matrix rotating around the z-axis is as follows:

$$R(z)=\begin{bmatrix}\cos\alpha & \sin\alpha & 0\\ -\sin\alpha & \cos\alpha & 0\\ 0 & 0 & 1\end{bmatrix} \quad (7)$$

2.2 Flow Theory

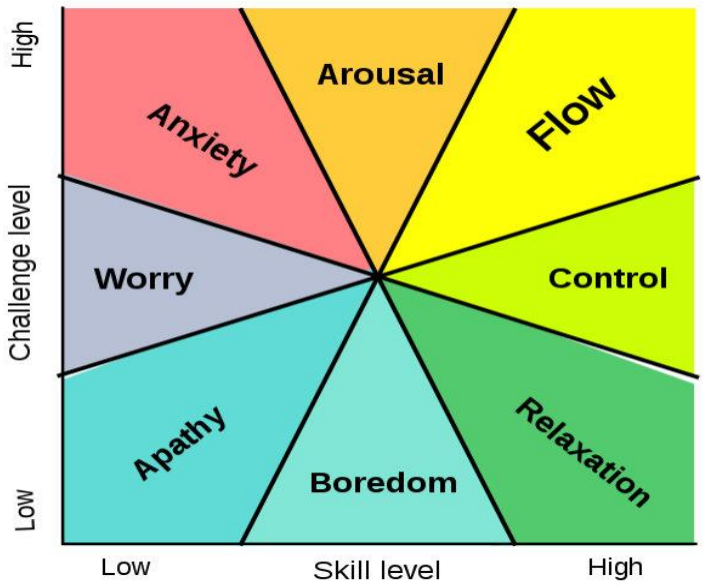

Figure 5: Schematic diagram of Flow Theory.

Flow theory (as shown in Figure 5) explains why people give their full

attention to something they are doing, and then filter out irrelevant sensations and enter a realm of oblivion. Since then, more and more scholars have begun to conduct studies related to immersion behaviour and modify its definition to make it more consistent with the description of the immersion state. At the present stage of sports training assistance optimisation, immersion theory is gradually applied to training activities by coaches, and the most representative form of immersion theory is to design a virtual reality training situation through computer technology to achieve "human-computer interaction". In the actual construction process, the designer needs to design the difficulty of the training content.

For example, in the underclass part of the public option class of sports, the virtual reality training platform within the virtual opponent will have different levels of difficulty, engineering students can freely choose according to their own level, will not affect the engineering students' experience of the training content due to the unreasonable difficulty settings. Therefore, the design of training content should be in line with the characteristics of the engineering students' recent development zone, so that the engineering students cannot help but be immersed in the context of the environment. In the hybrid training mode, the virtual reality training platform in the design of training content should be based on the immersion theory, virtual reality training platform (Neumann et al., 2018) immersion scene design to simplify the scene construction, so as not to affect the engineering students distraction, and to meet the different levels of engineering students learning ability status quo and characteristics. The design of the content of the theory and practice of the two parts of the training content is required to moderate the degree of difficulty, so as to facilitate the subsequent enhancement of the practice, stimulate the enthusiasm of engineering students to train, and improve the engineering students' sports skills (Faure, Limballe, Bideau, & Kulpa, 2020).

2.3 Hardware Equipment and Software Resources

Constructing a hybrid sports training model based on virtual reality technology, making virtual reality technology become the hand of sports training reform and innovation, and building a virtual reality sports training platform for teaching the hybrid training model. Therefore, in this part, the hardware equipment and software resources used to build the virtual reality sports training platform are elaborated.

2.3.1 Head Mounted Display Device

Virtual reality technology is convenient, feasible and easy to operate. Compared with mixed reality technology and augmented reality technology, it is more cost-effective and requires lower hardware equipment. It can be realized by using an HTC head-mounted display to connect to a computer.

operate. The HTC Vive device consists of a head-mounted display, two positioners, two wireless operating handles and a streaming box. The head-mounted display is used for users to experience virtual scenes through their visual senses. The streaming box can be connected to a pair of headphones, and users can feel the background music of the virtual scene, thereby achieving an immersive effect. The two positioners position objects in the area by emitting light to each other and plan the movable range. The wireless operating handle allows users to interact with the virtual environment, and the streaming box is used to connect the head-mounted display and the computer, as shown in Figure 6.

Figure 6: Schematic diagram of HTC head-mounted display device.

2.3.2 Software Resources for the Steam Platform

The virtual environments and virtual objects of the athletic training scenarios are resources from Steam, a game and software platform developed by Bram Cohen, the inventor of Bit Torrent, and hired by Valve Corporation, and one of the world's largest integrated digital distribution platforms. Steam is one of the largest comprehensive digital distribution platforms in the world, where players can buy, download, discuss, upload and share games and software. In this paper, a virtual reality table tennis game called Eleven: Table Tennis VR was used in the preliminary research. This game is not realistic enough in terms of physics engine, and it is not possible to capture the trajectory of the ball during the hitting process, and there is only a single game mode, with only the basic practice mode and the tournament mode, and the tournament mode only has a single version, which is not possible to network with real players.

The game mode only has a single player version, which can't be connected to the Internet to interact with real players, and lacks a sense of progression, which can't meet the needs of students at different levels. In order to provide a rich learning experience for the subjects in this paper, a virtual reality game called "Racket Fury: Table Tennis VR" was selected. The aim of the developers of this game is to solve the problems in the simulation of physical

effects and to provide a more realistic table tennis experience. The developers put a lot of effort into developing the physics effects from scratch and tweaking them with professional table tennis players. Through dedicated development, it is very realistic and can most accurately give players real physical and sensory feedback. This virtual reality table tennis game can be played as a stand-alone virtual table tennis game without internet access, or in an online environment where players can be matched with players from all over the world based on their level in the game, in a continent-spanning "World Table Tennis Tournament". This is a novel teaching resource for students to learn and understand more about the rules and regulations of table tennis while cultivating their interest in the sport. The actual interface is shown in Figures 7 and 8.

Figure 7: Screenshots of the virtual reality table tennis training operation process.

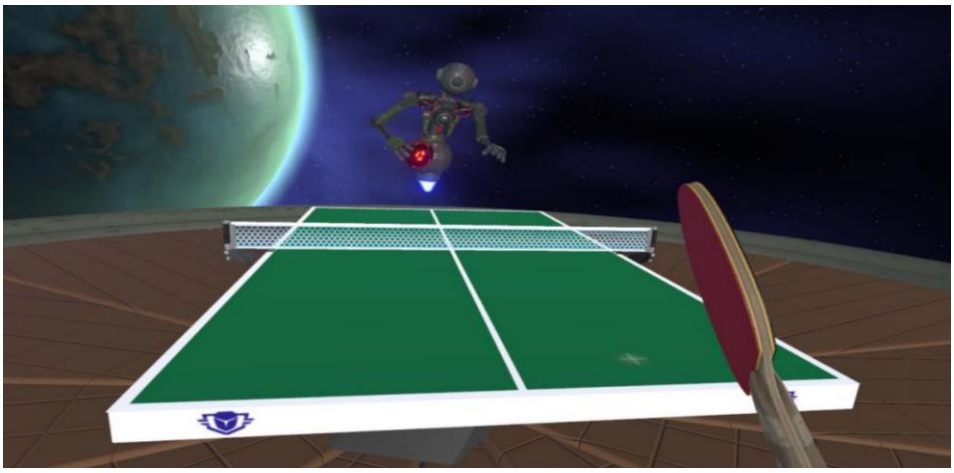

Figure 8: Screenshots of virtual reality table tennis training process.

The virtual reality table tennis training platform is used as the off-course virtual reality teaching of the hybrid table tennis teaching mode, and the teaching objectives, teaching difficulties, teaching process and teaching strategies of the public table tennis option course are integrated into the whole hybrid virtual reality table tennis teaching mode. Students participating in virtual

reality table tennis practice are immersed in an artificially created virtual table tennis teaching environment, where they can interact with virtual opponents in different virtual table tennis practice modes and learn in an immersive teaching situation. Therefore, the virtual reality table tennis training platform has an important role in stimulating students' interest in table tennis, mobilising students' motivation and improving learning efficiency in the blended teaching mode.

3. Experiment and Results

3.1 Research object

In this study, the impact of the application of virtual reality technology in the teaching of table tennis in colleges and universities is taken as the research object, and 97 college students from three parallel classes of non-physical education majors' table tennis elective course in the class of 2023 of a university are selected as the survey object in order to investigate the value of the application of the teaching mode of integrating virtual reality technology in the teaching of table tennis in colleges and universities, as shown in Table 1.

Table 1: Basic information on the subject of the study.

TYPE	TRADITIONAL FORM	VIRTUAL REALITY	VIDEO FORM
GRADE	2023	2023	2023
NUMBER OF STUDENTS	34	32	31
MAJOR	School of Computer Science	School of Education	School of Business

3.2 Experimental Setup

(1) Hardware equipment: This study uses the HTC Vive virtual reality head-mounted device, which consists of a VR head-mounted display, a VR control handle and a positioner. The user uses two Lighthouse base station infrared laser transmitters to synchronize the signals with the photosensitive sensors of the head display and controller to calculate the position and movement trajectory of the head display. Provide users with an excellent virtual reality experience. At the same time, the tracking and positioning of the headset and controller are very precise, with extremely low latency and no dizziness. It greatly stimulates user immersion and interactivity.

(2) Software equipment: Use the virtual reality game "Eleven: Table Tennis" developed by for Fun Labs. Build an international standard table tennis table for users with a length of 2.74 meters, a width of 1.525 meters, and a height of 0.76 meters. The user activity range is within the 3.5*3.5-meter interval. The game supports single-player practice and multi-player online confrontation,

and you can freely select the game difficulty and set parameters such as ball speed, fixed point, and rotation. Provide users with an excellent virtual table tennis experience, as shown in Figure 9.

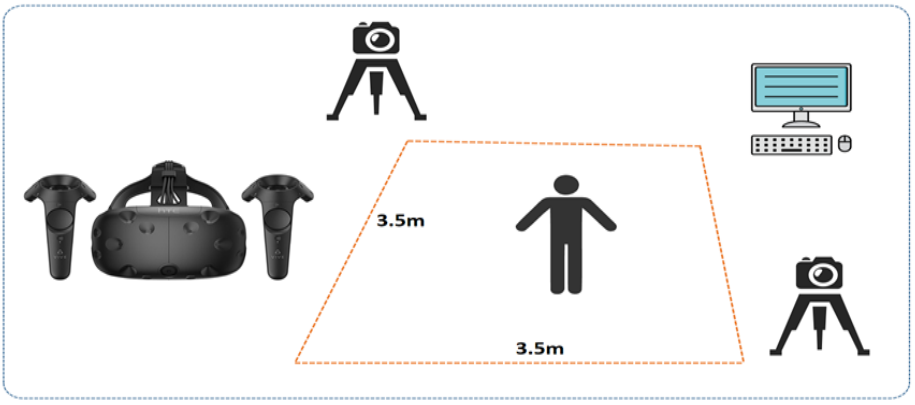

Figure 9: Schematic diagram of experimental design.

3.3 Experimental Results and Analysis

Only when the subjects show good consistency in all aspects before the experiment can they lay a good objective foundation for the implementation of subsequent teaching intervention. To this end, at the beginning of the research, I conducted a consistency analysis on the subjects' autonomous learning ability, interest in sports situations, skill assessment results, and physical fitness in table tennis learning to obtain a preliminary basis for teaching intervention.

According to the group design of this study, one-way analysis of variance was used in data analysis to test whether the differences between the means of multiple groups were statistically significant. If the results of the single-factor analysis are statistically significant ($P<0.05$), it means that at least one group of means is different from another group, and the LSD (least significant difference) method is further combined to obtain the difference between different groups. If the result of one-way analysis of variance is not statistically significant ($P>0.05$), it means that the mean difference between each group is not statistically significant.

(1) Consistency analysis of independent training capabilities: The independent learning ability of engineering students is the integrity training of engineering students in determining training goals, selecting training contents, monitoring the training process and evaluating the training results based on the training methods and skills acquired during the training process. In order to investigate whether there is a statistical difference between the control class and the experimental class in terms of engineering students' independent training ability in sports before the start of the table tennis course training, one-way ANOVA was applied to conduct a comparative analysis between different groups, as shown in Table 2.

Table 2: Results of the consistency analysis of independent training capabilities.

TYPE	F	P	TRADITIONAL		VR		VIDEO	
			M	SD	M	SD	M	SD
MOTIVATION	0.041	0.958	2.933	0.926	2.887	0.925	2.857	0.860
PROCESS	0.069	0.502	2.815	0.852	2.716	0.923	3.017	0.857
RESULT	1.753	0.176	3.162	0.845	2.862	1.138	2.752	0.632
ENVIRONMENT	0.523	0.589	3.125	0.716	3.136	0.637	3.071	0.677
AUTONOMY	0.366	0.691	2.989	0.587	2.883	0.607	2.911	0.532

The results of the consistency analysis of the independent training ability of the different groups showed that there was no significant difference between the control class and the experimental class in terms of their independent training ability before the table tennis training experiment (F=0.368, P>0.05). There was also no significant difference between the four dimensions of "training motivation, training process, training results and training environment" (P>0.05). This indicates that the different groups of engineering students in the independent training ability attitude and cognition of the convergence of the prerequisites for the conduct of this experiment.

(2) Analysis of interest consistency in sports contexts: With the improvement and development of constructivist concepts, the value of the role of contextual interest in the process of sports training has attracted much attention. The sports training context created by engineering students effectively stimulates engineering students' contextual interest experience and realizes the deep coupling of context and sports training. In order to observe whether there is a statistical difference between the engineering students' sports contextual interest in the control class and the experimental class before the experiment, the data of different groups were compared and analyzed using one-way ANOVA, as shown in Table 3.

Table 3: Results of the analysis of interest consistency in sports contexts.

TYPE	F	P	TRADITIONAL		VR		VIDEO	
			M	SD	M	SD	M	SD
NOVELTY	0.151	0.861	2.933	0.620	3.063	0.803	3.081	0.630
CHALLENGE	0.381	0.686	2.885	0.613	2.883	0.765	2.758	0.572
ATTENTION	0.297	0.755	2.463	0.600	2.570	0.554	2.501	0.555
EXPLORATORY	0.116	0.891	2.559	0.511	2.617	0.568	2.565	0.536
PLEASURE	0.563	0.571	2.963	0.677	2.836	0.834	3.024	0.634
GENERAL INTEREST	1.166	0.322	2.868	0.497	2.714	0.770	2.621	0.686
SPORTS SITUATIONAL INTEREST	0.102	0.902	2.788	0.222	2.788	0.375	2.758	0.235

Through the consistency analysis results of the interests in sports situations of different groups, it can be seen that before the start of the table tennis training experiment, engineering students in the control class and the experimental class had interests in sports situations (F=0.103, P>0.05) and "novelty, challenge, attention" There is no significant difference in the test content of the six dimensions of "power, exploration, pleasure, and overall interest" (P>0.05). It shows that the sports interests of engineering students in different groups tend to be at the same level before participating in table tennis courses, which meets the requirements for conducting training experiments.

(3) Consistency analysis of skills assessment scores: Motor skills are the ability to achieve rapid, accurate and smooth movement through continuous practice in accordance with certain technical requirements. In order to understand whether there is a statistical difference in the skill assessment scores of learners in the control class and the experimental class in the initial stage of the table tennis teaching course before the experiment, one-factor analysis of variance was used to conduct a comparative analysis of the data of different groups, as shown in Table 4.

Table 4: Results of the consistency analysis of skills assessment scores.

TYPE	F	P	TRADITIONAL		VR		VIDEO	
			M	SD	M	SD	M	SD
FOREHAND	0.368	0.693	7.425	3.249	7.281	2.303	6.903	1.938
PUSH TWO POINTS AND PUSH ONE POINT	1.030	0.361	7.265	2.466	7.281	2.098	7.693	1.693
TECHNICAL EVALUATION SCORE	1.965	0.143	2.789	1.039	3.156	1.139	2.645	0.985
SKILLS ASSESSMENT RESULTS	0.052	0.950	17.500	3.856	17.920	3.225	17.183	2.618

Through the consistency analysis results of the skill assessment scores of different groups, it can be seen that before the start of the table tennis teaching experiment, the skill assessment scores of students in the control class and the experimental class (F=0.051, P>0.05) and "forehand attack, two points.

The test results of the three test contents of "Push One Point and Action Skill Evaluation" are relatively close, and there is no significant difference (P>0.05). It shows that the selected experimental subjects have a low level of mastery of table tennis skills before the experiment, which ensures the consistency of the pre-test of the teaching experiment.

4. Conclusion

In this paper, we apply virtual reality technology to the auxiliary teaching of physical fitness training for college engineering students, allowing learners to complete real-time interaction of multiple senses with the help of VR sensing equipment in a virtual sports situation, and then combine it with the target incentive feedback mechanism to improve students' self-esteem Efficacy and learning interest, and the teaching effect and potential value achieved through practical exploration can not only promote the diversified development of sports skill learning, but also provide reference for the application of virtual reality technology in sports. Applying virtual reality technology to the physical fitness training and teaching of college engineering students can be used as a means to stimulate learners' potential learning abilities, awakening interest in sports situations while promoting the improvement of sports skills. However, learners in traditional classes do not have the same emotional attitude. No positive promotion effect was produced. Secondly, it is difficult for different teaching methods to have an effective stimulating effect on physical fitness. Experimental results show that the application effect of using virtual reality technology to optimize engineering students' physical fitness training is significant, proving the effectiveness of the proposed method.

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