

The Application of Virtual Simulation Experiment in Track and Field Teaching of Physical Education Major in Colleges and Universities

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Abstract

This paper takes the application of virtual simulation experiment teaching in track and field teaching of physical education in universities as the theme and adopts literature data and logical analysis methods. Through the analysis of the current situation of track and field referee teaching, it reveals the shortage of theoretical knowledge, experimental equipment and field, insufficient practical ability and single teaching methods. On this basis, through a brief introduction of track and field virtual simulation experiment experimental principle, experimental method, evaluation method, and experimental characteristics, further explore the teaching efficiency, teaching method innovation, traditional teaching supplement and development, teaching evaluation and feedback potential value, elaborated the track and field virtual simulation experiment in track and field teaching application value. At the same time, this paper analyzes the problems existing in the practical application of virtual simulation experiment teaching in track and field, such as the lack of virtual experiment situations and the lack of teamwork teaching activities. It provides some enlightenment and reference for the future combination of virtual simulation experiment teaching and track and field teaching in China.

Keywords

Track and Field Virtual Simulation, College Sports, Experimental Teaching

1. Introduction

The new era put forward higher requirements for talents, demanding not only a solid theoretical foundation, but also need to have strong innovation ability and

practical ability, at present, sports university traditional track and field competition organizations, and the referee experiment teaching curriculum system and education means are not enough to effectively cope with the actual needs of the two aspects. Therefore, in order to adapt to the continuous progress of social and economic development and the needs of higher education personnel training. At the same time, it must also take into account the continuous deepening and development of cultural experimental teaching in colleges and universities. Experimental teaching can not only deepen students' understanding of theoretical knowledge, but also cultivate students' ability to ask problems, analyze problems, and solve problems with theory and practice; it has a positive impact on stimulating thinking vitality, expanding thinking vision, and enhancing innovative thinking (Hou, Zhu, Zhang, Li, & Yang, 2022). Experimental teaching is an effective continuation of school curriculum teaching. It is an effective supplement to online learning, which is an effective supplement to traditional curriculum teaching (Ren, 2013). Virtual simulation technology, also known as "VR", is a human-computer interaction interface based on advanced computer technology, highly simulating human vision, hearing, and touch in the natural environment. It is a system simulation of three-dimensional dynamic visual view and realistic behavior with multi-information source fusion and interaction (Ge, Yan, & Li, 2022; Shao, Zhang, & Jin, 2018; Song, Chen, & Zhang, 2019); Users interact with the virtual world with the help of computers, making them produce immersive real user experience and feelings. The technology combines computer, AI artificial intelligence, network communication, image processing, sound and voice processing, sensing technology, and other fields of comprehensive technology (Shao et al., 2018). From 2019 to 2024, 4,792 national first-class courses of virtual simulation experiment teaching were identified. Virtual simulation technology is an important measure to promote the digital process of physical education in colleges and universities, integrate modern technology into experimental teaching, expand and supplement experimental teaching, and improve teaching quality. It is also necessary to follow the trend of The Times and the development direction of physical education digitalization in colleges and universities and future education reform.

The core and primary step of school physical education is physical education teaching, and improving the quality of this teaching link is very important for the implementation of school physical education. Track and field referee work has its unique nature and great influence, it not only serves the school level, but also extends to the whole society. The performance of students in the application of referee skills and methods after graduation is also an important standard to evaluate the effectiveness of cultivating sports talents and teachers. The training standards for sports students set by the Ministry of Education require students not only to have a solid theoretical foundation in sports science, but also to be familiar with the development law of human sports function and understand the effective ways to improve their physical quality. In addition, students should also have the professional ability

to teach physical education, guide training, plan and execute sports competitions, and serve as referees (Hou & Gao, 2011)。

The article “Track and Field Sports (Jump) Competition Organization and Referee Virtual Simulation Experiment Teaching” virtual simulation teaching project, for example, from the project teaching purpose, teaching experiment process, from the process of human-computer interaction and feedback and evaluation after the completion of teaching experiment, discusses the virtual simulation technology in track and field competition organization and referee experiment teaching practice and advantage and its deficiency in the process of experimental teaching, for the virtual simulation technology in the application of related subjects in the future.

2. Disadvantages of Traditional Track and Field Competition Organization and Referee Method Experiment Teaching

The theoretical learning needs of track and field judging for students majoring in colleges and universities all include the organization and arrangement of track and field competition, track and field competition judging method, track and field, track and field equipment, and track and field competition rules. The study of the whole theoretical system is indispensable because a complete school sports meeting arrangement, from the race to the race to the basis of the field equipment and facilities, according to the rules of track and field competition, according to the organization of the competition, to ensure the smooth progress of the games. In the process of track and field teaching, however, due to the limited class hours, skills learning class as the theme, the limited hours of track and field competition organization and arrangement, track and field competition referee, track and field, track and field equipment and track and field competition rules to master more difficult, and most in the process of teaching-learning, students just listen to teachers theory of track and field rules and referee is given priority to, and ignore track and field, track and field equipment, and competition organization, due to the actual operation of track and field teaching need larger space and time, not every student have sufficient opportunity to practical operation. This may lead to unequal practice opportunities, affect the balanced development of students' skills, easily lead to the incomplete and systematic lack of students' judgment, work, and learning, and affect students' practical ability.

2.1. Abstraction of Theoretical Knowledge

The teaching of the track and field referee method involves a lot of rules and clauses, which require students to have certain abstract thinking abilities. This puts forward higher requirements for practice teaching, if only rely on written materials and theory, it will lead to forming a single classroom teaching mode and interpretation method, cannot satisfy the students for realistic game scene judgment, may lead to students to combine theory with the actual referee process, understanding and application ability is insufficient.

2.2. Shortage of Experimental Equipment and Site

Experimental teaching in practice usually requires professional sports facilities and equipment, including track and field, track, timing system, and so on. At the same time, since the duties of the referee can only be imitated by one student, each student participates in the referee simulation and role-playing for a long time. In the case of limited resources, students' practice opportunities may be limited, which will affect the learning effect.

2.3. Single Teaching Method

Due to the limitation of teaching resources or teacher experience, teaching methods may be more traditional and single. The lack of innovative teaching methods may reduce students' interest and participation in learning. Since the teaching of track and field referee method involves a large number of rules and clauses, in the traditional teaching process, teachers mainly only rely on written materials and theoretical explanations, which leads to the dominant teaching, while students can only passively accept, it is difficult to cultivate their ability of independent thinking and innovation. It may make it difficult for students to combine theory with practical judgment process, and lack of understanding and application ability.

3. Application Examples of Virtual Simulation Experiment Teaching of Track and Field Sports

Combined with sports students courses and track and field sports jump project competition organization, the construction of a virtual simulation experiment teaching project can be more conducive to breaking through the traditional teaching mode, jump class competition organization and the referee teaching bottleneck can be more conducive to the teaching process of abstract theoretical knowledge, event arrangement, and actual case intuitive to students, improve the experimental teaching class, influenced by the site and equipment, and can also in the teaching process with more comprehensive, design and interesting experiment, so that the students master track and field rules and theory knowledge also can strengthen the students' innovation spirit and practice ability. In view of the above reasons, the virtual simulation teaching project of "Track and Field Sports (Jumping) Competition Organization and Referee Method" well complements the deficiencies in the traditional teaching mode.

3.1. Purpose of Teaching

The purpose of this project is to break through the bottleneck of traditional jumping competition organization and referee teaching through virtual simulation experiment teaching means and provide students with virtual competition scenes, virtual competition athletes, virtual penalty situations, and virtual referees. On the basis of the early stage of the theoretical knowledge learning, using virtual simulation technology of scenario simulation teaching method, let the students in the virtual 3D scene comprehensive field competition organization process, competition

referee knowledge, choose the required equipment and equipment, simulation athletes game decisions and virtual referee, writing records experiment operation, through the interaction between human and computer, deepen the students understanding of jump competition organization and the referee method, improve the effect of experimental teaching, in the virtual simulation interaction gradually formed basic knowledge structure of independent construction.

Through the virtual simulation teaching experiment of “Track and Field Sports (Jumping) Competition Organization and Referee Method Virtual Simulation Experiment Teaching”, students can:

1) Consolidate the basic theoretical knowledge. In the virtual simulation experiment, the scene teaching, the integration of the teaching content, and the actual situation improve the students. Through the modular classification of rule theory knowledge, it can help the students better understand and master the knowledge of jumping competition organization and judging.

2) Improve the practical application ability. Through the virtual simulation of the jumping referee, the students can better integrate into the competition scene, enrich the practical experience, and improve the students’ practical operation ability of finding, analyzing, and solving problems.

3.2. Experimental Procedures

The whole experiment process by the field competition organization process and competition referee knowledge, choosing the required equipment and equipment, simulation athletes game decisions and virtual referee, writing records, and so on four links, including the game venues and facilities, such as basic knowledge, as well as the location of the equipment and the final performance evaluation of virtual simulation experiment teaching content.

3.2.1. Organization Process and Relevant Knowledge of Competition Judges

In this process, the process of competition organization is presented in the form of a knowledge structure diagram. Students learn the competition process. The 3D mode shows the position of different competition judges in the competition place, and students can view different perspectives and click the positions of different positions, achieving the role of learning reinforcement.

3.2.2. Select the Equipment and Equipment Required for the Competition

This link is mainly presented in a situational mode, mainly for the display of equipment and equipment on the competition site. Students can drag the equipment and equipment to the corresponding position of the competition site through the mouse operation

3.2.3. Simulated Athlete Competition Scene Decision and Virtual Referee Decision

This link involves the application of basic knowledge and the content of experimental operation. The application of basic knowledge mainly includes: 1) the

selection of venues and equipment specifications for the high jump and the basis of the long jump; 2) the order and jump opportunity and jump time in the competition situation.

In the experimental operation section, students can make a penalty on whether the athletes have a foul action in the competition. In the scene of the competition, during the experiment, the athletes are presented from different angles to determine whether the movement conforms to the track and field competition rules of the IAAF.

3.2.4. Write the Score Record Form

In this part, the students will complete the answers in the form of the competition result record table. The questions will mainly rank the results of the competition in the next round, and the ranking of the best results, as well as the score of this part, will be included in the students' final assessment results.

3.2.5. Assessment Method

Students log on to the teaching platform as individuals and enter the assessment mode after completing the experiment preview. The experimental assessment mainly includes four parts: the organization process of the competition and the relevant knowledge of the referee, the equipment and equipment needed for the competition, the decision and the virtual referee, and writing the result record form. Students' experiment reports can be viewed from the background of the platform to obtain the scores of each experiment step so as to evaluate the students' grasp of the knowledge of jumping competition organization and judging.

4. Advantages of Virtual Simulation Technology in the Experimental Teaching of Track and Field Sports

4.1. Innovation of Teaching Methods

In the teaching process of track and field competition organization and referee method, students can only imagine and think in the form of explaining the competition situation, but cannot operate by themselves. The virtual simulation technology is applied to the experimental teaching of track and field competition organization and referee method, and students can simulate the real scene of the competition through the process of competition organization, so that students can feel the competition scene and make a judgment on whether the technical movements violate the rules from different perspectives for different competition situations.

4.2. Supplementation and Expansion of Traditional Teaching

The virtual simulation experiment teaching of "Track and Field Sports (Jumping) Competition Organization and Referee Method Virtual Simulation Experiment Teaching" can be combined with the traditional teaching methods to realize all-weather online open service on the national open experiment platform. At the same time, experimental teaching has the advantages of strong operability, high

repeatability, and high safety. Therefore, the application of virtual simulation technology to university track and field courses can be used as a supplement to the traditional teaching method to extend the time and space of experimental teaching.

4.3. Improvement of Teaching Efficiency

The virtual simulation experiment makes the teaching time more utilized; students can practice repeatedly according to their personal situation, and the teacher can manage and guide the students in the big class more conveniently. At the same time, virtual simulation experiment teaching is highly interesting and interactive, which can significantly improve students' interest and participation in learning, but also promote students' independent learning.

4.4. Teaching Evaluation and Feedback

The virtual simulation experiment teaching system can not only consolidate students' theoretical knowledge, but also assess whether students can make accurate decisions in the simulation competition situation and evaluate the experimental process of students' competition organization and judgment method. The system can automatically generate experimental reports and give timely feedback.

5. The Deficiency of Virtual Simulation Experiment Teaching in the Experiment Teaching of Track and Field Competition Organization and Referee Method

5.1. Insufficient Virtual Experimental Scenario

Given the economic cost and universal applicability, in the first stage of the course virtual simulation experiment project development, only the jump sports competition organization and referee sample digital simulation, which leads to a simulation experiment environment relatively simplified and idealized, at the same time, the athletes' foul case is relatively fixed. However, in the actual track and field adjudication process, the athletes at the scene are often involved in more complex and changeable situations. Each foul action and an emergency at the scene, these unpredictable variables will have an impact on the field and the effect.

5.2. Lack of Teamwork and Teaching Activities

Track and field competition organization and referee method: In the process of the competition, different judges are often needed to help each other and coordinate the organization to ensure the competition is smooth. Under the traditional teaching mode, teachers will organize different students to act as different judges and organize students to coordinate with each other by simulating the real competition situation to make the competition smooth. The virtual simulation system is a virtual platform system. Students usually use a computer to organize the track and field competition and the referee method, but they are unable to experience the mutual coordination and teamwork between different judges.

6. Conclusion

As an innovative result of the close combination of information technology and experimental teaching, the virtual simulation experiment can significantly improve the effect of experimental teaching through situational teaching, standardized demonstration, and intelligent evaluation. However, because the integration of a virtual simulation system and track and field competition organization and referee method is only the initial stage, there are still some deficiencies. Therefore, as long as the virtual simulation system is constantly explored and improved in the process of teaching experiments, the virtual simulation system, the track and field competition organization, and the referee method can be deeply integrated, play the advantages of virtual simulation experiment and practical practice, complement each other, and meet the needs of high-quality talent training in the new era.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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