

# Research and Exploration on the Application of Digital Technology in Physical Education Teaching

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**Abstract:** Digital teaching is the main trend in the current education environment. In the process of physical education teaching, through information technology education platforms, the modernization of teaching content, teaching methods, and teaching systems can be achieved, promoting the digitization of physical education teaching and promoting the comprehensive development of school education work. This article is guided by the Party's digital education strategy, based on the actual needs in the field of physical education and the development of students' core competencies. It conducts research and exploration on the digital physical education teaching mode, analyzes its application in modern physical education teaching and its impact on students' learning outcomes, and injects new impetus into the reform and development of modern physical education teaching.

## 1. Introduction

Digital ability is a highly summarized form of digital literacy and an extension of digital technology. Educational digital technology will continuously improve teaching models, and teachers' digital teaching abilities will also be constantly replaced. In the context of digitalization, it is necessary to focus on students' core competencies, improve their cognitive sense through diversified teaching modes, and provide guarantees for the digitalization of physical education teaching.

In the practice of physical education teaching, the effective use of digital technology will promote the implementation and reform of physical education ideas, teaching content, and systems, promote the innovation of teaching methods, modernize and scientize teaching methods, and enhance students' comprehensive physical literacy. The school organically integrates the blended teaching mode of "online+offline", closely integrating traditional classrooms and extracurricular activities. As contemporary teachers, we need to update our educational concepts, adapt to the development of the times, and focus on researching the impact of digital teaching on classroom teaching; Make full use of digital teaching platform, Internet information based teaching, multimedia, new media, micro class and MOOC to improve teaching methods and strategies, optimize teaching content and teaching process, strengthen the effective integration of PE teachers' extracurricular teaching resources, improve teachers' teaching and learning level, integrate evaluation into teaching, create a relaxed and happy learning environment, effectively stimulate interest in practice, and promote the comprehensive development of school education<sup>[1]</sup>.

## 2. The concept of digital sports

### 2.1 Digitization

The report of the 20th National Congress of the Communist Party of China proposed to promote the digitization of education. Education digitalization is to use the Internet and various learning platforms to provide digital learning resources and electronic textbooks, and promote the development of education towards digitalization, modernization and networking<sup>[2]</sup>. To provide students and teachers with a new learning and teaching environment, promote high-quality education, cultivate future citizens of the digital society, and shoulder the historical mission of building an educational powerhouse.

## **2.2 Digital Sports**

It refers to the use of information technology, the use of online and offline data services and AI algorithms to integrate and schedule sports resources, and the use of Internet technology, IT and other means to record information in the form of digital games and media in a digital way, providing intelligent, digital and digital support for digital sports teaching. The digital analysis ability, digital device operation ability, online teaching ability, digital teaching resource acquisition ability, integration and innovation ability of physical education teachers are the most important abilities in physical education teaching under the digital background. Teachers can analyze and record students' exercise indicators through digital devices and programs, develop scientifically reasonable and personalized learning plans, enhance students' awareness of sports, and further promote the development of sports.

## **3. The Application Significance of Digital Physical Education Teaching Mode**

### **3.1 Improve teaching quality and expand learning methods**

Sports, as an important subject for improving students' comprehensive quality, digital technology has extraordinary significance for the high-quality development of sports education. In digital physical education teaching, information technology is ingeniously integrated with subject teaching content, and teaching forms become more flexible and diverse. Teachers constantly adapt and apply new technologies to guide students, which can significantly shorten the teaching process, stimulate students' enthusiasm and initiative for independent participation in physical education learning, promote the development of students' sports skills, healthy behaviors, and sports ethics, and improve the quality and effectiveness of vocational physical education teaching. For example, teachers can create new teaching courses, publish pre class preview content and teaching tasks on the learning platform, view learning practice and attendance on the platform after class, communicate and interact with students online, and provide overall evaluation and feedback through the online evaluation system; Improve the accuracy and efficiency of evaluation, promote balanced allocation of educational resources, break through geographical and time constraints, provide personalized education, lower the threshold for education acquisition, make knowledge acquisition more convenient, and broaden the coverage of education.

### **3.2 Improve students' ability to analyze and solve problems**

Digital skills are essential qualities for digital talents, which not only reflect students' ability to output professional knowledge, but also demonstrate their soft power in non professional skills. Digital technology has brought opportunities for integrated curriculum, innovative methods, and personalized teaching to physical education teaching. The digital physical education teaching method is supported by cognitive psychology, constructivism, and modern educational technology, focusing on cultivating students' abilities of autonomous learning, mutual cooperation, and active innovation, emphasizing their initiative and subject status. The digital evaluation system also provides more flexible and scientific means for physical exercise and fitness testing; In physical education classes, proficient use of digital technology can drive students to constantly explore new knowledge, expand their imagination, satisfy curiosity, effectively improve their sports skills and physical strength, strengthen their ability to analyze and solve problems, and enhance their good information literacy.

### **3.3 Refine and structure the knowledge points of physical education teaching**

Through digital technology, the physical education classroom has been reorganized, further refining and structuring the knowledge points of physical education teaching. Realize multimedia in targeted teaching content, and utilize advanced teaching equipment to complement and connect teaching content; To achieve dynamic teaching in terms of teaching format, which not only attracts students' attention but also reflects more interest<sup>[3]</sup>. Due to the emphasis on demonstration in physical education teaching, the application of digital technology has enriched the demonstration of movements in physical education classrooms, enabling students to solidly grasp the details and

essentials of each movement. After fully demonstrating the new movements, teachers use digital media technology to demonstrate functions such as reduced speed playback and replay of high difficulty movements, and then provide detailed explanations of some key movements, making physical education teaching pay more attention to details and breaking through the key and difficult points of physical education teaching. Students can better understand and master some instantaneous movement techniques, which can effectively strengthen the classroom atmosphere of physical education teaching and effectively improve students' physical literacy.

#### **4. The current application status of digital physical education teaching mode**

Nowadays, the application of digital technology in physical education in Chinese schools is ubiquitous, fully leveraging the excellence of information technology. For example, online courses and learning platforms provide recorded videos of physical education classes, teaching resources, etc; Augmented reality and virtual reality technology: providing students with opportunities to experience sports, training, and competitions in a virtual environment; Mobile fitness application: provides unique personalized fitness and exercise strategies, records students' learning data and progress; Information technology equipment, sensors, wristbands, body fat scales, etc. are used to monitor changes in students.

But compared with overseas, China's digital sports practice started relatively late, and the development level has been delayed for many years<sup>[4]</sup>. In regions with uneven regional development, there are problems such as incomplete digital empowerment supply systems and insufficient policy support. Also, in primary and secondary schools, there are issues regarding physical education digital governance, like inadequate management and supervision, resources shortages, a widening gap in composite talents, and teachers' inadequate training and mastery of digital technology. The increasing dependence of students on digital devices has reduced the practical operation and interactivity in sports activities, and lowered the overall effectiveness of physical education. Numerous factors prevent schools from widely using multimedia; Schools should enrich the creation of digital technology cloud platforms, organize and share teaching resources, and provide convenience for teachers and students to learn physical education knowledge.

### **5. Strategies for Optimizing Digital Physical Education Teaching Models**

#### **5.1 Utilize multimedia resources to vividly present sports knowledge and skills**

The application of digital technology has greatly expanded the space of physical education teaching, and make the teaching process more diverse and flexible. Teachers can effectively apply digital technology in teaching, combining high-quality courses from various learning platforms and provincial-level excellent online open courses, using video, animation recording, editing, etc. to create micro lessons, combined with specific explanations, to present students with an intuitive, practical, and highly operable classroom, facilitating students' understanding, digestion, and absorption of knowledge points. There are a large number of complex movements, techniques, and structures in physical education teaching content that need to be connected and accurately completed within a moment; For example, in Tai Chi, there are push hand movements for vigorous exercises, aerial movements for high jump and long jump, and underwater decomposition movements for various swimming poses<sup>[4]</sup>. Micro lessons are a situational and intuitive online teaching method that injects more vitality into classroom introduction and interactive activities. While increasing the fun of physical education classroom teaching, they also serve as a supplement and expansion to traditional classrooms, promoting the comprehensive development of students' multi-level literacy; Digital image capture and playback of the action process can also be carried out in teaching. During the process of watching practice videos, teachers and students can analyze and evaluate each other to identify errors and deepen their memory and understanding of the action. Students can review and review physical education learning content at any time through the learning platform classroom; Online courses have small limitations and have significant effects on teaching techniques, tactics, and

sports theory, improving sports skills, and enabling students to engage in independent physical exercise, greatly enhancing the teaching effectiveness of physical education.

## **5.2 Interdisciplinary integration and cross platform connection to promote active student participation**

The requirements for the integration of information technology and subject teaching have been repeatedly proposed in the curriculum standards of various disciplines, emphasizing the importance of interdisciplinary learning. Through project-based interdisciplinary teaching, two or more subjects can be combined to explore the ideas of interdisciplinary integration and the process of interdisciplinary teaching design<sup>[5]</sup>. Teachers can guide students to face real social situations, flexibly explore, analyze, and think, and keep up with the pace of digital teaching.

Digital technology provides more ways and platforms for physical education teaching, and students can participate in physical exercise at any time through various online courses and learning platforms. As a grass-roots teacher, we should not only pay attention to the application of digital technology in physical education teaching, integrate information technology into teaching concepts and models and integrate it with discipline teaching, and strive to build an information-based teaching environment using the Internet platform and high-quality resources to build an independent learning platform for students<sup>[5]</sup>. For example, the content of the National Smart Education Cloud Platform for Primary and Secondary Schools contains resources from various disciplines such as morality, intelligence, physical fitness, aesthetics, and labor, providing opportunities for students to search for high-quality subject resources and digital facilities; Teachers can draw on tools such as Questionnaire Star, Golden Data, web crawlers, and educational psychology to provide basic statistical feedback and deconstruct students' learning data and behavior; You can also use the Learning Platform system to follow up and analyze students' interaction patterns and strategy choices; We adopt Unity's convenient teaching environment and scenario simulation to evaluate teachers' teaching methods, approaches, and teaching effectiveness.

Information platform is an important way to implement teaching, which can improve students' initiative in learning, solve learning problems, and achieve two-way interaction between students and teachers. In the process of physical education teaching, teachers can use various devices such as mobile phones, tablets, and computers to slow down the video movements in the courseware, pause the camera, and other teaching methods to present the technical details of each moment's movement, solving the learning effectiveness and doubts of students in the cognitive stage.

## **5.3 Utilizing augmented reality and virtual reality technology to enhance students' sports experience**

By utilizing augmented reality and virtual technology in digital technology, a new teaching model for physical education can be developed, leading to a trend towards digitalization, multimedia, and programmatic teaching methods. Virtual reality technology (VR) encompasses three-dimensional digital technology, sensor technology, and optical electronic technology, with a focus on sensory systems such as vision, touch, and smell. In the process of human-computer interaction, it is not necessary to use mechanical inputs and outputs anymore. Instead, various sensors can be used for human-computer interaction, making it more in line with human understanding and making it more interesting and simple. Augmented reality (AR) technology is a widely used technique that skillfully integrates virtual information with the real world through multimedia, 3D modeling, sensing, and other means. After simulating text, images, music, videos, and other information, it achieves "enhancement" of the real world. Motion capture technology has become an integral part of the fields of virtual reality (VR) and augmented reality (AR); By capturing actions and postures in the real world and applying them to virtual environments, motion capture technology provides users with a more immersive and interactive experience, promoting the progress and application of virtual reality and augmented reality technology<sup>[6]</sup>.

The AI Smart Sports Center is an interactive fitness and exercise space created by combining traditional fitness venues with new technologies and applications. It utilizes visual recognition technology, interactive technology, motion capture systems, and intelligent IoT technologies to

provide a one-stop smart sports and fitness plan, which is conducive to optimizing athlete training effectiveness and improving exercise performance through data analysis technology. For example, various applications such as AI skipping rope, AI gymnastics, long jump, VR running, VR rowing, VR boxing, etc. can meet most sports needs.

In the context of digitalization, intelligent sports devices can provide more diverse ways of sports activities; For example, installing the USENSE badminton racket sensing device on the racket to automatically record ball strength, speed, curvature, etc. The digital technology tennis equipment tracks and captures students' movement data in real time, helping them to timely understand and improve the accuracy and stability of techniques such as forehand, backhand, high-pressure ball, and level shot during practice. The volleyball digital teaching system uses virtual characters in 3D rotation technology to demonstrate movements, allowing students to view every detail of the teacher's movements at any time. They can also input their own exercises into virtual characters, enhancing the teaching atmosphere and effectiveness.

#### **5.4 Continuously focus on teacher skills and build personalized learning paths for students**

In physical education teaching, schools should implement and improve policies and regulations for promoting digital teaching, actively organize and mobilize teachers to participate in various sports digital information technology literacy training, provide diverse platforms for teachers to showcase and release, and enable teachers to constantly surpass themselves in an innovative growth atmosphere and make breakthroughs in teaching mode reconstruction; Develop physical education teaching materials and courseware based on the actual level of self digitization ability, collect, organize and classify some digital teaching resources on the internet, and improve students' learning enthusiasm and educational quality.

The personalized characteristics of students are very strong, and it is necessary to implement a flexible blended learning model. The promotion of personalized digital teaching is more inclined towards students' participation and emotional perception. Integrating physical education teaching with digital technology; By utilizing information technology to analyze students' physical, mental, and learning situations, and implementing more specialized and in-depth teaching, students' interest in physical education learning can be more easily satisfied. For example, teachers constantly revise and enrich teaching plans in practice, fully integrate the actual situation and teaching resources of each student, use online platforms to carry out teacher-student interaction, upload course content to learning platforms according to students' actual situations, provide targeted learning education and sports projects that students are interested in, and improve teaching effectiveness.

## **6. Conclusion**

The digital sports teaching model provides more diversified and convenient sports experiences and sports teaching services in teaching, and is an important manifestation of focusing on the development of students' core competencies. As contemporary teachers, we need to update our educational concepts, adapt to the development of the times, and focus on researching the impact of digital teaching on classroom teaching; Enhance teaching methods and strategies, optimize teaching content and process, integrate evaluation into teaching, create a relaxed and enjoyable learning environment, effectively stimulate interest in practice, and gradually form good habits of self-directed learning and exercise. In short, digital teaching is the main trend in the current educational environment. Utilizing digital teaching platforms and multimedia resources, strengthening interdisciplinary integration, enhancing reality and virtual reality technology, and improving the information technology integration ability of teachers and students in physical education classrooms play an important role in improving the quality of physical education teaching and overall student literacy. At present, there are still some problems and challenges in digital physical education teaching methods, such as the investment in technological equipment updates and the improvement of teachers' information literacy. Therefore, in the future, further in-depth research is needed on the practical application of digital physical education teaching methods, exploring more comprehensive teaching models and strategies, and injecting new impetus into the reform and development of physical education teaching.

## References

- [1] Zhang Jie. Integration of Information Technology and Science Teaching Based on Interdisciplinary Concepts [J] Information Technology Education in Primary and Secondary Schools, 2023 (8).
- [2] Wen Shubin. The application of micro courses in physical education teaching in vocational colleges in the digital age [J] Contemporary Sports Technology, 2022, 12 (35).
- [3] Gu Jun. Interdisciplinary Education Application Based on Digital Devices [J] China Information Technology Education, 2023 (13).
- [4] Lv Haiyan .A Brief Discussion on the Utilization of Digital Technology in Junior High School Physical Education Teaching [J] Art and Physical Training, 2017 (32).
- [5] Guan Jinghong. Analysis of the Hybrid Teaching Mode of Aerobics Courses in Colleges and Universities in the Digital Age [J] New Sports, 2023 (12).
- [6] Xie Guoqiang .A Brief Discussion on the Promotion of Digitalization in Vocational Sports [J] Sports Goods and Technology, 2021 (12).