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Exploration on the Transformation Practice of Intelligent Teaching in College Table Tennis Based on Artificial Intelligence

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ABSTRACT
Against the backdrop pf the continuous deepening and implementation of the education digitalization strategy, artificial intelligence (AI) technology provides important technical support for the modernization transformation of college table tennis teaching, and promotes the upgrading of the traditional experience-dominated teaching model to an intelligent teaching form characterized by precision, personalized, and scientization. From the perspective of the practical needs and development goals of college table tennis teaching and combined with the functional characteristics and application scenarios of AI technology, this paper systematically expounds the application value and implementation conditions of AI in college table tennis teaching, analyzes the key links and implementation paths in the teaching transformation process, and constructs an intelligent teaching framework from the aspects of teaching model reconstruction, teaching content optimization, and teaching staff improvement to provide feasible solutions for improving the quality and efficiency of college table tennis teaching. It aims to promote the digital transformation process of physical education in colleges and universities and cultivate contemporary college students with both lifelong physical education awareness and digital literacy.

KEYWORDS
Artificial intelligence; College table tennis; Intelligent teaching; Teaching transformation

1 Introduction

The "Opinions on Accelerating the Digitalization of Education" issued by the Ministry of Education and other eight departments clearly states that "artificial intelligence (AI) technology should be integrated into all elements and the entire process of education and teaching", which provides direct guidance and implementation basis for the digital transformation of physical education in higher education institutions [1]. As an important event in the college physical education curriculum system, table tennis combines competitive attributes with public participation, and serves as an important carrier for enhancing students' comprehensive sports literacy and achieving the goal of physical education. At present, college table tennis teaching is gradually moving towards intelligence and modernization. The deep involvement of AI technology can effectively address the shortcomings of traditional teaching models in terms of feedback efficiency, personalized guidance, and scientific training, and promote the renewal of teaching concepts, the reconstruction of teaching models, and the optimization of teaching methods, so as to provide technical support and innovative paths for the high-quality development of college table tennis teaching, and further highlight the educational function and contemporary value of physical education in the new era.

2 The Significant Value of AI Empowering Intelligent Table Tennis Teaching in Colleges and Universities

Through multi-dimensional data collection and in-depth analysis, intelligent table tennis teaching in colleges and universities empowered by AI can precisely identify the differentiated characteristics of students in terms of technical mastery, learning pace, and interest orientation, thus breaking through the limitations of uniformity and standardization in traditional teaching models. Technologies such as intelligent motion capture and sports data modeling can collect and analyze student's core motion parameters such as batting posture, swing force, and footwork adjustment in real time, and generate personalized digital learning portfolios in accordance with the technical standards specific to table tennis to visually reflect individual learning outcomes and potential improvement directions. Based on the dynamic teaching plans and hierarchical training tasks generated from these portfolios, teachers can adjust teaching priorities flexibly according to the students' basic levels. For example, they can strengthen movement norms for learners with weak foundations, or optimize competitive strategies for those with outstanding abilities. The precise teaching support can promote the implementation of the concept of individualized teaching, enhance students' learning autonomy and skill improvement efficiency, and achieve a coordinated improvement of teaching quality and educational effectiveness.

3 Practical Basis for Intelligent Table Tennis Teaching in Colleges and Universities Empowered by AI

3.2 Increasingly Sound Foundation for Technical Application

The continuous iteration and deep optimization of AI technology have established an increasingly mature technical application system for intelligent table tennis teaching in colleges and universities. The continuous upgrading of computer vision recognition accuracy and deep learning algorithm models has significantly improved the reliability of movement capture, motion posture analysis, and motion data quantitative analysis of table tennis, and conducted full-process dynamic tracking and multi-dimensional diagnosis of key technical links such as student ' s batting, footwork, and movement connection. The large-scale application of new teaching equipment such as intelligent pitching devices and VR/AR simulation training systems in college teaching scenarios has expanded the training dimensions and interaction forms of traditional table tennis teaching, and broken through the constraints of practical conditions including venue, opponents, and class hours, thus providing students with a regular, personalized, and highly simulated training environment [2]. With the steady advancement of digitalization in higher education, the coverage of high-speed and stable campus networks, the construction of standardized intelligent teaching spaces, and the comprehensive deployment of supporting data processing terminals have provided underlying hardware support for the deep integration of AI technology and table tennis teaching processes. It can ensure the stable operation of intelligent teaching systems, real-time data transmission, and timely feedback, laying a solid and feasible foundation for AI to fully empower intelligent table tennis teaching in colleges and universities.

3.2 Gradually Deepened Transformation of Teaching Concepts

With the continuous deepening of college physical education reform in the new era, the teaching concept of table tennis is shifting from traditional skill-orientation to multi-dimensional talent education-orientation, which consolidates the conceptual foundation for the deep integration of AI and table tennis teaching. College table tennis teaching incorporates the cultivation of students ' lifelong sports awareness, enhancement of digital literacy, and development of comprehensive athletic abilities into its teaching goals, and establishes a value orientation centered on student development, so as to strengthen personalized design and precise supply in teaching practice. This conceptual transformation is highly compatible with the application characteristics of AI technology such as data-driven, dynamic adaptation, and personalized feedback in terms of objective logic, implementation paths, and evaluation dimensions, providing theoretical support and directional guidance for the construction of an intelligent table tennis teaching model. Many college physical education teachers take the initiative to update their teaching cognition, establish digital and intelligent teaching concepts, and learn and apply related AI-related technical tools to integrate technical logic with the laws specific to table tennis teaching and continuously optimize practical paths in instructional design, classroom organization, after-class feedback and other aspects, thereby promoting the steady improvement of teaching efficiency [3]. At the same time, most students have shown significantly improved adaptability to and acceptance of intelligent teaching environments, their willingness to participate in intelligent learning, interactive training, and data-based self-evaluation continues to rise, and both teachers and students have formed a joint force in conceptual identity and practical behavior, which create a stable and sustainable development environment for the normalized promotion of AI-empowered intelligent table tennis teaching.

4 Transformation Paths of AI-empowered Intelligent Table Tennis Teaching in Colleges and Universities

4.1 Construct AI-driven Teaching Content

From the current situation of college table tennis teaching, the reconfiguration of teaching content requires not only moving movements and theoretical knowledge online and converting them into digital forms, but also taking AI as the technical foundation to achieve a deep upgrade from static teaching materials to a dynamically adaptive teaching system. Traditional table tennis teaching mostly focuses on fixed course outlines, with unified standards for movement instruction, tactical analysis, and physical training, which is difficult to accommodate students with different foundations and learning progress. Over time, polarization is likely to occur: students with weak foundations cannot keep up with the progress and find it difficult to learn, while advanced students feel that the content is too basic and fail to realize effective improvement. The construction of AI-centered teaching content can help break this standardized and one-size-fits-all model. By leveraging AI technology, teachers can continuously track students ' movement performance, classroom learning feedback, and periodic progress, so that the teaching content can be dynamically adjusted and flexibly adapted at all times [4]. In technical teaching, instead of uniformly playing demonstration videos and explaining fixed movements,

teacher should restructure and combine teaching priorities according to each student's physical coordination, force characteristics, and technical weaknesses. They can divide complex table tennis techniques into modules to ensure that the content difficulty precisely matches students' learning ability. In theoretical and tactical teaching, teachers should also break away from the limitations of textbook knowledge and closely integrate tactical selection, on-court response, rule application and other content with real-time practice scenarios to transform abstract theoretical knowledge into practical methods that can be directly applied on the table, thus truly enabling students to apply what they have learned.

4.2 Innovate AI-integrated Teaching Methods

In college table tennis teaching, the integration of AI and traditional teaching methods must take technology as the focus, reorganize teaching logic and optimize the practical process, so as to shift the classroom from the previous experience-based judgment to a more precise and individualized teaching model. Traditional table tennis teaching mostly relies on teachers' on-site observation, demonstration and explanation, and its teaching progress and content design often cover the overall level of the class, making it difficult to take into account each student's technical weaknesses and learning pace. However, the introduction of AI brings new possibilities to the classroom from multiple aspects such as motion capture, real-time feedback, and practice design. In practical teaching, teachers can use intelligent systems to capture students' subtle movements such as swing angles, footwork, and force trajectories in real time, and convert abstract and intangible technical essentials into visual, quantifiable, and adjustable data [5]. In this way, students no longer have to explore only through vague physical sensations, but can clearly recognize their own problems. Teachers can also use these intelligent tools to design hierarchical and progressive practice tasks, and modularize and restructure basic skill training, tactical thinking cultivation, and practical confrontation training, thus enabling students of different foundations and levels to steadily improve at their own suitable pace. This integration approach can free teachers from a large amount of repetitive and mechanical work, and allow them to devote more energy to targeted guidance, personalized communication, and classroom guidance. Accordingly, table tennis teaching can transform from unified and standardized output to more flexible and precise personalized cultivation, and truly be consistent with the learning characteristics and cognitive laws of contemporary college students, thereby bringing sustained innovative vitality to the classroom.

4.3 Strengthen the Construction of AI-adapted Teaching Staff

The transformation of intelligent table tennis teaching in colleges and universities driven by AI should not be limited to the superficial application of technical tools. It must also take the construction of a teaching team that is adapted to AI teaching scenarios as an important support, so as to fundamentally ensure the stability and sustainability of the reform. Although college table tennis teachers do not need to become full-time technical researchers, their teaching cognition, practical ability, and professional literacy must be iterated synchronously with the intelligent teaching environment. They should not only understand the operational logic of AI in motion capture, data monitoring, training planning, learning situation diagnosis and other aspects, and proficiently use intelligent platforms to design teaching processes, adjust according to real-time feedback, formulate personalized plans, and conduct quantitative assessment of teaching effects, but also uphold the professional core and educational value of table tennis. On the basis of data generated by technology, they should make independent judgments with long-term teaching experience, balance technical rationality and humanistic care, and strengthen the guidance on students' sports psychology, training status, and team collaboration, so as to provide the functions of emotional communication, value guidance, and spiritual motivation that intelligent systems cannot cover [6]. To promote the development of AI-adapted teaching staff, higher education institutions should also establish a systematic and normalized development mechanism. Through multiple paths such as hierarchical and classified training, interdisciplinary teaching and research exchanges, intelligent teaching practice pilots, and university-enterprise collaborative training, they can eliminate the application barriers and psychological estrangement of teachers towards new technology. This will drive teachers to transform from single skill instructors to comprehensive teaching entities that integrate instructional design, process control, personalized guidance, and comprehensive evaluation, thus forming a literacy structure that deeply integrates professional sports competence and intelligent technology application ability. When teachers can actively, proficiently, and creatively integrate AI into the entire process of table tennis teaching, and achieve the organic unity of technology application, teaching laws, and student development, the transformation of intelligent table tennis teaching in college and universities can get rid of the dilemma of formalism, and truly turn technological advantages into a sustained driving force for improving teaching quality, thereby laying a solid talent foundation for the intelligent reform of college physical education.

5 Conclusion

The deep integration of AI technology is fundamentally restructuring the implementation logic and development pattern of college table tennis teaching, and opening up a brand-new dimension for the intelligent transformation of traditional teaching models. Looking ahead, college physical education needs to continuously adhere to the development direction of digital education, actively adapt to the iteration of AI technology, continuously expand the application scenarios and implementation paths of intelligent teaching in practice, and specifically solve the practical problems such as outdated concepts, inadequate technology application, and insufficient teaching adaptability in the transformation process. It should drive the innovation of teaching models with technological innovation and ensure the improvement of educational quality through system optimization, in order to strengthen professional skill teaching while giving full play to the comprehensive educational function of table tennis. Meanwhile, it should strive to cultivate college students' stable lifelong sports habits, solid digital application abilities, and comprehensive comprehensive qualities, so as to provide referable and replicable practical support and development impetus for the overall digital transformation of college physical education.

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