Journal of Contemporary Educational Research, 2026, Volume 10, Issue 4
http://ojs.bbwpublisher.com/index.php/JCER
Online ISSN: 2208-8474
Print ISSN: 2208-8466

Innovative Research and Practice on the Teaching Model of the Course "School Physical Education" in Colleges and Universities Empowered by Artificial Intelligence

Songwei Zhong, Zhongjun Chen, Yan Zhang*

Guangxi Science & Technology Normal University, Laibin 546100, Guangxi, China

Author to whom correspondence should be addressed.

Abstract: The iterative upgrading of artificial intelligence (AI) technology injects new momentum into the innovation of physical education theory teaching in colleges and universities, creating opportunities for optimizing teaching models. As a core theoretical course in physical education majors, "School Physical Education" faces challenges such as low student engagement, a lack of personalized guidance, and monotonous teaching methods in its traditional teaching model, which restricts the improvement of teaching quality. This study analyzes the current teaching status and issues of the course and explores innovative teaching paths empowered by AI. It finds that scientific application of AI can enhance teaching effectiveness, optimize resource allocation, and promote personalized learning, yet challenges such as insufficient integration of technology with teaching scenarios and the need for improved digital literacy among teachers remain. Based on these findings, this paper proposes practical paths, including constructing a hybrid teaching model of "AI diagnosis + teacher-led instruction" and strengthening the construction of smart teaching environments and resource platforms, to provide theoretical and practical support for the high-quality development of the course.

Keywords: Artificial intelligence; School physical education; Teaching model

Online publication: May 15, 2026

1. Introduction

Driven by the rapid development of information technology and the advancement of the national education digitalization strategy, the field of education is undergoing a profound transition from "Internet + Education" to "AI + Education." Policies such as "China Education Modernization 2035" explicitly call for accelerating the construction of intelligent learning environments and promoting the deep integration of modern information technology with the entire teaching process [1]. As an important component of higher

education, physical education in colleges and universities is experiencing comprehensive reforms in teaching philosophies, methods, and practical models. As a core foundational theoretical course in physical education majors, "School Physical Education" plays an irreplaceable role in cultivating students' physical education philosophies, consolidating teaching skills, and enhancing curriculum design abilities. However, the actual teaching of this course still centers on teacher lectures, with a lack of classroom interaction, which restricts the cultivation of students' autonomous learning and critical thinking abilities, leading to poor teaching outcomes. It also fails to meet the diverse capacity-building needs of physical education teachers in the new era. The unique advantages of AI in data analysis and virtual simulation provide a new path to address these challenges, enabling the transformation of classrooms towards intelligence, personalization, and interactivity [2,3]. Its integration into physical education teaching in colleges and universities can effectively achieve precision teaching, innovate teaching forms, and strengthen dynamic monitoring and safety guarantees throughout the teaching process [4].

Currently, the application of AI in physical education teaching in colleges and universities is still in its preliminary exploration stage, with most physical education theory courses continuing to use traditional teaching models, and the teaching empowerment value of intelligent technologies not being fully realized [5]. Against this backdrop, an in-depth exploration of the current status, issues, and innovative paths of the teaching model of "School Physical Education" empowered by AI holds significant theoretical and practical value for promoting the reform of physical education theory courses in colleges and universities and improving the quality of talent cultivation in physical education majors.

2. Current status of teaching models for the course "School Physical Education" in colleges and universities

2.1. Inherent limitations of traditional teaching models

Currently, the course "School Physical Education" in colleges and universities still widely adopts the traditional paradigm of "teacher lectures, students passively receive," with a teaching focus biased towards the indoctrination of theoretical knowledge and low proportions and poor effects of practical teaching. This lecture-based teaching compresses students' classroom participation space, hinders the cultivation of their critical thinking and autonomous learning abilities, leading to insufficient student engagement and weakened learning motivation. Simultaneously, the course content is disconnected from the needs of physical education reform in primary and secondary schools, and the integration of moral and ideological education elements is not deep or natural enough, weakening the educational function of "fostering virtue through education." Although some colleges and universities have attempted new models such as flipped classrooms and blended online-offline learning, the intelligent and integrated transformation of the course is still in its infancy, lacking systematic reform design and in-depth practical support, and has not yet formed a mature model that can be replicated and promoted, further highlighting the issue of insufficient depth in the informatization application of the course.

2.2. Insufficient depth of informatization application

Under the background of promoting education digitalization, although various digital means have been introduced into physical education teaching in colleges and universities, the application of information technology in the course "School Physical Education" remains superficial and has not been deeply integrated

with teaching practice. On the one hand, affected by factors such as technological conditions and financial investment, some colleges and universities have obvious shortcomings in the configuration of software and hardware such as intelligent teaching platforms and data analysis tools, and some AI applications have insufficient adaptability to the actual teaching needs of the course, making it difficult to effectively serve daily teaching [6]; on the other hand, although online resources such as MOOCs and micro-lectures have enriched the carriers of theoretical teaching, they are loosely connected with offline classrooms and have not formed a collaborative teaching effect of "online complementarity, offline deepening." Digital technologies such as AI have not truly penetrated core teaching links such as lesson preparation, instruction, and evaluation, hindering the intelligent transformation of the course teaching model and also highlighting the urgency of improving teachers' digital literacy.

2.3. Lagging improvement of teachers' digital literacy

In the context of the rapid development of intelligent education, teachers' digital literacy is a key factor affecting the effectiveness of teaching reform. Currently, physical education teachers in colleges and universities generally have issues such as incomplete mastery of digital teaching tools and insufficient ability to apply intelligent technologies; traditional teacher training systems focus on professional skills and traditional teaching methods, lacking systematic training in teachers' information literacy and intelligent technology applications. Some teachers have insufficient adaptation to educational intelligent technologies and lack awareness of active learning and technological integration, making it difficult to deeply combine AI tools with course teaching, restricting the intelligent transformation process of the course "School Physical Education" and also becoming an important practical constraint factor for the transformation.

2.4. Practical constraints on intelligent transformation

The intelligent transformation of the course "School Physical Education" in colleges and universities is still in the exploration stage and faces multiple practical constraints: First, there is insufficient integration of technology with teaching needs, with the functional design of some AI systems having low alignment with course content and teaching objectives, making it difficult to solve actual teaching problems; second, teachers have limited understanding and application ability of AI tools, unable to fully exert the empowerment value of technology, resulting in technological applications being superficial; third, colleges and universities have insufficient investment in digital teaching resources and intelligent platform construction, lacking high-quality resources covering the entire course process, making it difficult to meet the needs of intelligent teaching; fourth, the teaching data privacy protection mechanism is not perfect, with security risks in the collection, storage, and use of student data, affecting the orderly promotion of intelligent teaching. These constraints also point out the key breakthrough directions for subsequent teaching model innovation.

3. Innovative paths for teaching models empowered by AI

3.1. Constructing a blended teaching model of "intelligent analysis + teacher guidance"

In response to the needs of intelligent transformation of the course "School Physical Education," constructing a blended teaching model based on intelligent data analysis and teacher teaching decision-making as the core is the key path for transformation. Introduce an intelligent teaching assistance system to collect learning data such as student classroom behavior, after-class exercises, and online quizzes in real time, and accurately

analyze students' knowledge mastery and cognitive weaknesses through AI algorithms [7]. Teachers can then adjust teaching, optimize rhythm, and implement differentiated guidance based on this analysis to achieve precision teaching objectives.

The core of this model is human-machine collaboration, with a clear division of responsibilities: the intelligent system is responsible for data collection, analysis, and preliminary feedback, while teachers focus on teaching decision-making, classroom guidance, and personalized tutoring, preventing technology from replacing the core role of teachers. Simultaneously, guide teachers to optimize teaching design with data analysis and encourage students to rationally use intelligent tools to enhance autonomous learning and critical thinking. This model balances technological efficiency with teaching humanity, providing a feasible solution for intelligent teaching of the course and laying the foundation for subsequent innovative paths.

3.2. Constructing a smart teaching environment and a diversified resource platform

To improve the teaching quality of "School Physical Education," it is necessary to construct a complete smart teaching environment to provide software and hardware support for teaching model innovation. Colleges and universities should increase investment in infrastructure, create smart teaching spaces integrating intelligent terminals, interactive devices, and high-speed networks, and introduce VR and AR technologies to transform abstract physical education theories into immersive scenarios, enhancing students' learning interest and cognitive effects [8]; simultaneously, integrate core functions and build an integrated smart teaching platform to achieve functions such as resource pushing and real-time interaction, providing convenience for teachers and students and facilitating the implementation of the blended teaching model.

In addition, it is necessary to integrate high-quality teaching cases, micro-lectures, academic literature, and other resources to build a dynamically updated digital resource library, enriching teaching content and expanding teaching boundaries. Through software and hardware collaboration, construct a smart teaching system of "environmental support + resource guarantee" to provide support for the intelligent transformation of the course, work in synergy with the blended teaching model, and lay the foundation for subsequent improvements in teacher literacy and teaching process reengineering.

3.3. Improving teachers' AI literacy and teaching innovation abilities

In an intelligent teaching environment, the role of teachers has shifted from traditional knowledge transmitters to student learning guides, teaching activity designers, and technological integration practitioners. Systematically improving physical education teachers' AI application literacy and teaching innovation abilities is an important task for the intelligent reform of the course "School Physical Education." Colleges and universities should formulate targeted professional development plans to enhance teachers' abilities in intelligent teaching design, data-driven evaluation, and AI tool applications through special training, teaching seminars, and other activities, enabling them to skillfully use intelligent technologies to optimize teaching and solve problems [9]. Simultaneously, it is necessary to improve teacher incentive mechanisms, incorporate achievements in the integration of AI and courses into evaluations and performance assessments, commend outstanding innovators, and provide resource support to stimulate teachers' initiative in reform. Standardize the collection and use of student data to prevent information leakage and ensure the orderly conduct of intelligent teaching, providing teacher support for subsequent teaching process reengineering.

3.4. Deep integration of AI for teaching process reengineering

To promote the innovation of the teaching model of the course "School Physical Education," it is necessary to comprehensively optimize and reengineer the course teaching process with AI technology as support, deeply integrating intelligent technologies into the entire teaching process before, during, and after class to achieve intelligent upgrades of all teaching links.

3.4.1. Pre-class intelligent guided learning

Teachers can use AI tools to assist in lesson preparation and pre-class guided learning, designing targeted guided learning outlines and preview tasks based on course objectives to guide students in autonomous preview. When students encounter difficulties or key knowledge points during preview, they can obtain intuitive explanations, case demonstrations, and extended explanations through conversational AI tools to deepen their knowledge understanding. Pre-class intelligent guided learning can improve the pertinence and efficiency of student preview, help them sort out knowledge frameworks, and lay the foundation for in-depth classroom teaching.

3.4.2. In-class human-machine interactive teaching

Classroom teaching is the core of student knowledge construction and ability enhancement, and constructing an interactive teaching environment can improve students' learning interest and cognitive effects. Reasonably introducing intelligent assistance tools in the classroom can improve the timeliness of classroom feedback and student participation; teachers can dynamically grasp students' learning status through real-time learning situation data from the intelligent system, adjust teaching strategies, and conduct precision interventions and personalized guidance [10]. Simultaneously, by utilizing functions such as scenario simulation and case analysis of the intelligent system, guide students in discussion and exploration to enhance the practicality and thinking depth of the course.

The application of intelligent technologies should avoid excessive reliance, clearly defining their teaching assistance role and serving teaching objectives and student ability cultivation. Teachers should control the frequency of technology use, guide students in in-depth thinking and active exploration to achieve knowledge internalization and transfer, and prevent classroom formalization; adhering to the concept of "human-machine collaboration, learning-centered" can promote the high-quality development of course teaching and lay the foundation for post-class consolidation and enhancement.

3.4.3. Post-class consolidation and enhancement

The post-class link is an important extension of teaching and is crucial for improving students' knowledge internalization and application abilities. Post-class learning in "School Physical Education" is not only about reviewing and consolidating classroom content but also guiding students to achieve knowledge transfer and deepening. With the help of an intelligent teaching platform, teachers can accurately grade assignments and generate individualized reports through an intelligent grading system, clarifying students' deficiencies in knowledge understanding, expression, and practice and providing targeted feedback; students can utilize functions such as self-evaluation, wrong question review, and personalized exercises on the platform for autonomous review to improve efficiency.

In post-class intelligent-assisted learning, it is necessary to prevent students from overly relying on system answers and hints. Teachers should reasonably control technological intervention and guide students

in maintaining autonomous thinking to ensure that technology serves learning objectives [10]. In the closed-loop teaching of "pre-class guided learning–in-class interaction–post-class feedback," intelligent tools undertake functions such as data analysis, resource support, and assisted feedback, while teachers play a core role in guidance and regulation, jointly constructing an intelligent teaching model centered on student development and laying the foundation for subsequent improvements in teaching evaluation and safety guarantees.

3.5. Improving teaching evaluation mechanisms and safety guarantees

The long-term promotion of course teaching reform requires not only innovation in teaching content and methods but also the dual support of a scientific evaluation system and a safety guarantee mechanism. In terms of evaluation, learning data should be collected relying on intelligent platforms to construct a comprehensive evaluation model combining process and outcome evaluations and involving multiple subjects to comprehensively assess students' comprehensive qualities and improve evaluation precision and comprehensiveness [9]. In terms of safety, colleges and universities should improve data privacy protection systems, standardize data collection, use, and management, implement information desensitization and anonymization processing, and strengthen supervision of third-party platforms; teachers should adhere to data ethics, clearly inform students of data use rules, and construct a safe and trustworthy intelligent teaching environment [7]. Schools should strengthen top-level design and resource guarantees, incorporate course intelligent reform into the overall digitalization layout, increase financial investment and long-term support, and promote the sustained and standardized development of teaching innovation to lay a solid institutional and resource foundation for the high-quality development of the course.

4. Conclusion and recommendations

The rapid development of AI technology offers new opportunities and practical directions for the reform of the "School Physical Education" curriculum. By constructing a human-machine collaborative teaching model of "data diagnosis–teacher guidance," improving the intelligent teaching environment and resource platform, enhancing teachers' proficiency in AI applications, and establishing a comprehensive multidimensional evaluation and data security mechanism, we can effectively address the prominent issues in current curriculum teaching, improve teaching efficiency and quality, increase students' interest in learning and classroom participation, and provide technological support for curriculum teaching innovation. Meanwhile, the integration of AI into this curriculum still faces practical challenges such as individual differences in teachers' technological adaptability, insufficient students' autonomous learning abilities, and inadequate integration of technology with teaching scenarios.

In the future, it is necessary to strengthen systematic and personalized training for teachers' digital literacy, enhancing their ability to apply intelligent technologies and innovate in teaching; deepen empirical research on the integration of AI with the curriculum, summarize and promote typical cases, and explore replicable teaching models; strengthen international exchanges, learn from advanced foreign experiences in intelligent education, and optimize innovative paths based on the actual situation of physical education in Chinese universities. In advancing teaching reforms, it is crucial to adhere to educational laws and the fundamental goal of "fostering virtue and nurturing talent," uphold the core principle of "technology serving teaching," promote the deep integration of AI with "School Physical Education," avoid formalistic

applications of technology, fully leverage the empowering value of technology, support the high-quality and sustainable development of college physical education theory courses, and provide strong support for cultivating high-quality physical education professionals in the new era.

Funding

Practice and Exploration of the "Five-in-One" Teaching Reform of the School Physical Education Course in Local Teacher-Training Universities under the Perspective of Curriculum Ideological and Political Education (Project Number: 2024GKSYG33)

Disclosure statement

The authors declare no conflict of interest.

References

[1] Central Committee of the Communist Party of China and the State Council, 2019, China's Education Modernization 2035, viewed November 2, 2025, http://www.moe.gov.cn/jyb_xwfb/s6052/moe_838/201902/t20190223_370857.html

[2] Yan J, 2025, Realistic Obstruction and Mitigation Strategies: The Embodied Cognitive Shift in School Physical Education under the Background of Generative AI. Journal of Guangzhou Sport University, 45(06): 10–19.

[3] Song X, 2025, Application Scenarios and Practical Cases of AI in Physical Education Teaching. Journal of the Chinese Society of Education, (S1): 7–8.

[4] Du X, Qin H, 2025, The Integration of AI and Physical Education Teaching under Embeddedness Theory: Patterns, Dilemmas, and Mitigation Paths. Journal of Beijing Sport University, 48(09): 131–142.

[5] Niu J, Xu W, Qian J, 2025, Digital Sports Ecosystem: A New Path for the Development of College Physical Education in the AI Era—Taking Peking University as an Example. Journal of Beijing Sport University, 48(09): 12–25.

[6] Li M, Wang D, Yuan Q, et al., 2025, Exploration of Digital Technology Empowerment in College Physical Education Teaching Reform. Journal of Sports Culture, (08): 25–31.

[7] Liu Z, Tuo J, Huang G, et al., 2025, The Era Opportunity, Value Implications, and Implementation Paths of Digital Transformation in School Physical Education. Teaching and Management, (18): 42–46.

[8] Ma Y, Mu J, 2025, Digital Empowerment of Physical Education Teachers' Professional Development: Triple Logic, Implementation Mechanism, and Path Direction. Journal of Guangzhou Sport University, 45(02): 43–52.

[9] Guo J, Xu Y, Xue Z, et al., 2025, Function Scenarios and Development Paths of Metaverse Physical Education Teaching for Education Digitalization. Sports & Science, 46(01): 62–71.

[10] Yin Z, Jiang J, Liu H, et al., 2025, Research on High-Quality Cultivation Paths for Physical Education Teachers' Digital Literacy. Journal of Tianjin Sport University, 40(05): 497–505.