

Article

Exploration and Application Research of DeepSeek in Physical Education Teaching

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Abstract: In recent years, artificial intelligence technology has developed rapidly, prompting the field of physical education to transition from a traditional, experience-driven model to a new paradigm of data empowerment. This article comprehensively employs literature review and case analysis methodologies to systematically explore the underlying connotation, practical value, existing problems, and future strategies of artificial intelligence integration in physical education. The results indicate that utilizing advanced technologies, such as DeepSeek, for capturing and correcting classroom movements enables highly accurate feedback during technical movement instruction. Furthermore, integrating deep learning algorithms and big data analytics into personalized training prescriptions significantly enhances both teacher instructional efficiency and students' overall sports performance. By constructing a hybrid teaching model that combines real-time artificial intelligence analysis with expert classroom guidance, institutions can successfully realize a collaborative 'double-teacher' environment. However, the conclusion highlights that artificial intelligence educational applications currently face substantial challenges, including data privacy concerns, inherent algorithm bias, prohibitive equipment costs, and a general lack of artificial intelligence literacy among teaching staff. Moving forward, strategic efforts must be directed across four critical dimensions: robust national policy support, strict cultural and ethical guidelines, the development of cost-effective control equipment, and comprehensive teacher quality training. These initiatives will promote the sustainable development of artificial intelligence in physical education and provide a foundational paradigm for digital transformation in the modern educational era.

Keywords: deepseek; physical education; artificial intelligence; deep learning; digital transformation

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1. Introduction

In recent years, the rapid rise of artificial intelligence technologies such as DeepSeek has had a widespread impact on various industries in our country [1]. The field of physical education is also about to undergo changes due to the cross-border integration with artificial intelligence technology. The digital transformation of physical education is urgent. Mastering and using digital technology to promote the reform of the entire education form is an important measure to follow the national sports policy and promote the construction of a strong sports country and lead the world. The party and the country attach great importance to relevant technological innovations. In the "Notice on Strengthening Artificial Intelligence Education in Primary and Secondary Schools," the General Office of the Ministry of Education clarified the development goal of basically popularizing artificial intelligence education in primary and secondary schools in 2030. It established six major tasks such as building a curriculum system, developing teaching resources, building a teaching environment, and carrying out teacher training [1, 2]. It standardized the application path of generative artificial intelligence in primary and secondary education, focusing on highlighting the important orientation of educating

people, value guidance, and technology for good. In April 2025, nine departments including the Ministry of Education clearly stated in the "Opinions on Accelerating the Digitalization of Education" that "artificial intelligence should be used to assist educational reform" to promote the coordinated development of educational digitalization and intelligence.

DeepSeek artificial intelligence is not a single model architecture, but a large model system with multiple functions. Its core goal is to simulate human intelligence through deep learning and attention mechanisms, in order to achieve the ultimate goal of general artificial intelligence. DeepSeek can promote the innovation of physical education teaching methods and provide sufficient information resources for teachers to prepare lessons. This view has also been verified in "Scenario Analysis of DeepSeek Large Model Empowering Teaching Application." Currently, research on the exploration and application of artificial intelligence technologies such as DeepSeek in physical education is still in its infancy. In view of this, this article systematically elaborates on the integration of DeepSeek and physical education exploration and application, clarifies the current application status of artificial intelligence in physical education scenarios, and then proposes relevant development strategies to provide reference ideas for its practical exploration in the field of physical education.

2. The Connotation of Exploration and Application of DeepSeek Physical Education Teaching

2.1. Transformation from "relying on Experience" to "using Data"

Traditional physical education classes primarily rely on teachers' personal teaching experience to manage the curriculum. With the advancement of digital teaching, large artificial intelligence models such as DeepSeek have been integrated into teaching practices. These models can collect and analyze various sports data from students by processing images or videos, and they can also automatically generate comprehensive class reports and individual physical fitness reports [3]. The application of artificial intelligence technology in teaching provides a practical foundation for physical education teachers to make informed decisions, address student differences, and adjust training plans. For instance, AI tools can generate teaching objectives, situational cases, multiple evaluation plans, and creative assignments that align with new curriculum standards, ultimately creating an intelligent, personalized, and diversified smart classroom. This significantly enhances teachers' efficiency in lesson preparation [3]. Consequently, physical education teachers can input relevant teaching instructions and obtain a comprehensive framework report with a single action, enabling them to prepare lessons based on data-driven insights.

2.2. Classroom Reform: Break Out of the Old Framework of Unified Demonstration and Move Towards a New Path That Varies from Person to Person

It is mentioned that 3D technology can accurately measure athletes' limb angle changes, body center of gravity movement trajectories, and limb coordination, thereby enabling the creation of tailored action optimization plans. In physical education teaching, DeepSeek-related search engines are utilized to decompose students' movements in 3D and mark common errors. Visual tools are required or recommended, and virtual demonstrations can be generated by combining these with electronic whiteboard displays to address the challenges of effective teacher demonstrations. Additionally, DeepSeek can be employed to formulate differentiated training prescriptions and automatically generate various levels of training tasks based on multiple individual student indicators, aligning with the relevant national requirements for hierarchical teaching classrooms [4].

2.3. Training-Event-Evaluation Closed Loop: From "after-Class Remediation" to "whole-Process AI Accompanying Learning"

The DeepSeek big data platform integrates various data from training processes, event performance, and physiological monitoring to generate visual data reports and intelligent analysis models. This provides a scientific and reliable basis for coaches to formulate teaching and training strategies [5, 6]. Coaches can assess athletes' physical condition, fatigue levels, and performance in specialized skills through the platform, enabling them to design training plans and adjust training intensity according to the tactical needs of competitions.

The following is a sample table of output from DeepSeek for different projects [5, 7] (As shown in Table 1).

Table 1. DeepSeek's embedding methods and output examples at each stage.

link	Deepseek embedding method	Output example
before training	Generate 4-week periodized training	Design a 30-day improvement plan for girls with a 800 m score of 4'20"before the exam, including freehand exercises without equipment and dietary suggestions.
in training	Real-time error correction and psychological intervention	Upload a video of dribbling, and AI will mark "insufficient wrist force" and "knee buckle" and compare it with professional athletes; push meditation and motivational words to students whose shooting percentage has dropped sharply. Automatically output the list of interesting events
After training	Generate events and reviews with one click	in school sports games, basketball league schedule, and 5-level football skills scale to reduce the administrative burden of teachers.

Taking 800-meter training as an example, the role of AI in accompanying learning can be explained. First, a plan must be designed that considers both training and diet. The 30-day period is divided into four weeks of progressive training: in the first week, intensity begins with 200-meter intervals, progressing to 600 meters \times 3 sets of interval runs, requiring students to maintain a stable pace of 2 minutes and 15 seconds. The final week is relatively simple, with 200 meters \times 3 sets of sprints, reducing the pace to 1 minute and 55 seconds as preparation for the next month's test. Additionally, daily fat-loss warm-up training from video platforms and increased protein intake in the diet contribute to long-term weight loss and improved 800-meter performance. Secondly, professional small programs supplemented by DeepSeek analysis are utilized. During training, a mobile phone is positioned opposite the track to record a 60-frame video, which is then input into the "pose demo" applet. This applet analyzes technical movements frame by frame and provides silhouette overlays of high-level athletes at the same angle, allowing clear identification of gaps and necessary adjustments. During exercise, if the heart rate becomes too fast and causes breathing difficulties, the artificial intelligence watch provides prompts to restore running rhythm. Finally, DeepSeek generates training conclusions and evaluations. After training, data on completion status, results, and weight are uploaded. DeepSeek produces training evaluations and assesses athletes' physical condition. The data obtained offers valuable insights for teachers to analyze and develop training plans.

2.4. Growth of Teachers' Professional Quality: From "teacher of Sports Skills" to "guide of Skills Innovation"

At the teaching level, artificial intelligence tools are continuing to penetrate the teaching and scientific research scenarios of physical education. Teachers only need to enter four key pieces of information: "teaching objectives, student characteristics, site conditions, and special needs" to generate a scientific and comprehensive lesson plan, which can significantly improve the efficiency of classroom preparation. At the scientific research level, artificial intelligence tools are deeply integrated with AI-related functions to create a one-stop service chain of "questioning, retrieval, and creation" that significantly lowers the threshold for physical education teachers to conduct academic research and helps improve research efficiency. In the "School-led Home-School Community Collaborative Protection of Student Privacy Policy in the Digital Era," it is emphasized that processes and specifications for the collection, storage, use, sharing, and destruction of private information must be clearly defined to ensure all operations involving student privacy are properly managed. Therefore, in the field of school physical education, based on the analysis and application of DeepSeek for student data, it is necessary to strengthen information technology to build a secure line of defense to avoid the risk of privacy leaks [8]. However, some research indicates that blind faith in DeepSeek may lead teachers to become overly dependent on data and algorithms. Teachers should recognize that AI is positioned as an advanced teaching aid, not a substitute for educational judgment. They must critically evaluate the results generated by AI to avoid over-reliance on technology, which could weaken their role as educators and diminish their independent thinking abilities.

3. The Core Value of the Integration of DeepSeek and Physical Education

The core value of the integration of DeepSeek and physical education teaching focuses on "three modernizations, two mentions and one regression": accurate personalized sports data analysis and formulation of personalized sports prescriptions; scientific evaluation, turning relevant indicators of students and teachers into algorithms, making teaching research evidence-based; deeply interesting, applying intelligent interactive technology to large recess activities, which can greatly enhance students' immersive experience; improve teaching efficiency, one-click generation of lesson plans, reports, and home-school push, significantly reducing administrative burdens and increasing guidance efficiency; enhance teachers' creativity, allowing data charts and first drafts of papers to be quickly obtained through language queries, enabling cross-border courses to become core results in seconds; finally, it returns to the essence of educating people, reducing teachers' work pressure, redirecting energy to companionship, motivation, and verbal communication, and making the playground once again a place where teachers and students interact and improve together.

4. Analysis of Application Problems of AI Led by DeepSeek in Physical Education

4.1. Application Pattern: Pilot Breakthroughs and Regional Imbalances Coexist

There are significant differences in the development level of artificial intelligence across various regions in China, exhibiting a ladder-like distribution pattern of "eastern-central-northeast-western." This disparity highlights the spatial imbalance in economic development, industrial foundation, and human resources among regions, while also indicating future development potential and directions for each area in the field of artificial intelligence. In economically advanced regions such as the Yangtze River Delta and Pearl River Delta, smart playgrounds have been widely implemented in some universities and middle schools. Utilizing technologies like visual skeletal point measurement, insole pressure sensors, and wearable heart rate monitors, these systems enable data collection and real-time violation detection during sports events, facilitating a shift in teaching evaluation from "experience-led" to "data-supported." However, due to constraints such as funding, network infrastructure, and data security capabilities, most county schools remain reliant on manual entry methods, such as "mobile phone + Excel."

This technological gap between urban and rural areas underscores a development pattern characterized by "partial surprises and overall imbalance."

4.2. Core Dilemma: Dual Constraints of Utilization Efficiency, Technology Adaptation, and Teacher Quality

The deep integration of artificial intelligence and physical education still faces multi-dimensional bottlenecks. In terms of resource utilization efficiency, there is a lack of effective exchange of practical cases between schools, making it difficult to compare practical effects horizontally, affecting resource sharing, and indirectly leading to duplication of development and waste of resources [5, 9]. At the teacher level, the digital literacy level of physical education teachers is uneven, and the application of artificial intelligence technology is ineffective, making it difficult to transform technological advantages into teaching effectiveness. At the normative level, the industry has yet to form unified technical standards and ethical guidelines. The ownership of students' biological data is vague, the after-school training homework push model is old and inefficient, and the risk of data leakage and the hidden danger of "technological reversal" coexist, causing schools and teachers to fall into the dilemma of "wanting to use but afraid to use it."

4.3. Problem Solving: Establishing a Technology Adaptation and Teacher Support System

To address the current challenges, efforts must be coordinated in three key areas: first, enhancing the inclusiveness and adaptability of technology research and development by overcoming the limitations of general algorithms, creating personalized training models for specific groups, reducing the barriers to equipment deployment, promoting "lightweight, low-cost" smart teaching solutions, and improving technology accessibility in county schools; secondly, establishing a digital literacy improvement system for physical education teachers by deepening school-enterprise cooperation, understanding the specific needs of enterprises and industries for digital talents, gaining knowledge of emerging technologies, processes, standards, and broadening teachers' digital perspectives [10–12].

5. Propose Corresponding Development Strategies Based on the Current Situation of Artificial Intelligence Application in Physical Education

5.1. Optimize the Efficiency of Fund Use and Promote Low-Cost Portable Testing Equipment

The successful design of portable, convenient, and mobile self-resetting hurdle racks can significantly save manpower and material resources while reducing the time required for competitions, teaching, and training. Related convenient equipment minimizes testing time and costs, offering long-term usability with simple maintenance. Additionally, establishing a unified data standard is essential. The Department of Education should lead efforts to formulate standardized units of measurement for test indicators [13–15]. It is also necessary to mandate open-source AI platform interfaces. Enterprises must ensure data "granularity alignment" before integrating their systems into campuses, enabling data interoperability and mutual recognition across different brands of equipment. This facilitates seamless migration of student sports data without redundant entries, enhancing data availability and school management flexibility. Practical AI training should be implemented, with special usage certificates issued upon completion. In-service physical education teachers must undergo comprehensive practical training, earning AI usage completion certificates after passing assessments. Furthermore, colleges and universities should collaborate with enterprises to establish free training bases during holidays, offering intensive week-long exercises to help teachers quickly master smart equipment application skills. This approach prevents equipment from being idle or wasted.

5.2. Strictly Adhere to the Bottom Line of Data Privacy and Implement the Principle of "data Does Not Leave the School"

During the use of artificial intelligence, it is inevitable to collect relevant information about students, and this information may become a target for hackers [16]. In the process of DeepSeek technology being integrated into physical education, the privacy and security of students' sensitive information are directly tied to their rights and interests as well as the credibility of the education system. Therefore, the "data does not leave the school" rule must be strictly enforced. The government should establish specific laws and regulations to define data security responsibilities, refine regulatory standards for the entire process of data collection, storage, use, and destruction, enhance supervision of school data management, and ensure compliance through regular specialized inspections. At the technical level, advanced data encryption technology should be employed to safeguard student sports data, while anonymizing information that involves personal identity. Schools must also develop a data security emergency plan, establish a rapid response mechanism for emergencies, and strengthen data security education and awareness among teachers, students, and parents. These measures aim to build a foundation of trust for the promotion and application of AI technology in physical education.

5.3. Add "progress Points" for Physical Education in the High School Entrance Examination

The "progress score" evaluation method can be used to assess sports performance based on the extent of students' progress, effectively increasing their participation in extracurricular sports and enthusiasm for exercise. This approach positively influences the cultivation of students' interest in sports, enthusiasm, and lifelong awareness of physical activity. To maximize the motivational impact of the progress score evaluation method, the "AI Progress Report" module is integrated into the high school entrance examination sports scoring system. This module relies on a standardized student sports data collection system to accurately record benchmark test data at the beginning of the semester and retest data at the end of the semester, forming a comprehensive sports growth file. The progress score evaluation encompasses all physical education test items in the high school entrance examination. In addition to standard indicators, new evaluation metrics are included in the bonus point category. Bonus point rules are designed according to a progress ladder, ensuring that students with varying baseline levels receive growth incentives. To maintain fairness in evaluation, progress accounting standards must be unified, data collection time points clarified, test site requirements specified, and equipment calibration standards established. The AI system automatically compares and analyzes the data to generate an objective and fair progress report. Schools are required to use the AI platform to synchronize progress data with students and parents in real time, combining it with personalized training suggestions generated by AI [3, 5]. This approach guides students to strengthen weaker areas in a targeted manner, using examinations to promote practice and stimulate intrinsic motivation for independent exercise. It also enhances schools' enthusiasm for utilizing AI in precise training, contributing to improved overall physical education quality and students' physical fitness levels.

6. Conclusion

This article specifically examines the integration of DeepSeek, an intelligent tool, with physical education. Research indicates that DeepSeek has introduced significant advancements to physical education through its robust intelligent generation and data processing capabilities. It has shifted physical education teaching from a traditionally experience-based model to a data-driven scientific approach. This article consolidates relevant theoretical and practical perspectives on this integration, demonstrating its feasibility and value in enhancing physical education and improving teaching quality. However, challenges have emerged in the practical application of DeepSeek in physical education, such as regional disparities in its adoption, incompatibility with certain practical scenarios, and misinterpretations of its value by educators. To address these issues, the following solutions are proposed: First, optimize the technology by promoting

low-cost, portable testing equipment that can accommodate diverse physical education scenarios and enhance functional accuracy. Second, improve privacy protection technologies for students and establish emergency measures to safeguard personal privacy to the greatest extent possible. Third, incorporate "progress points" for physical education into high school entrance examinations to boost students' motivation to learn physical knowledge, participate in physical activities, and enhance both teaching quality and students' physical fitness. Further efforts should focus on integrating DeepSeek into all aspects of physical education, fully leveraging the value of physical education data, and developing a comprehensive digital teaching system encompassing "teaching, learning, practice, and evaluation." Additionally, long-term strategies and innovative approaches should be explored to enable technology to support physical education on a larger scale, fostering comprehensive innovation in physical education talent training models and providing sustained digital support for the high-quality development of physical education in the modern era.

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