

Artificial Intelligence in Higher Education Physical Education: Pathways, Scenarios, and Limitations of Technology-Enabled Reform

Zhenyu Zhang^{1, *}, Rozaireen Bin Muszali²

¹ School of Sports Science, Lingnan Normal University, Zhanjiang City, 524048, China

² Universiti Pendidikan Sultan Idris, 35900 Tanjong Malim, Perak Darul Ridzuan, Malaysia

* Corresponding author: (Email: Zahngzhenyu@163.com)

Abstract: In the context of "Healthy China 2030" and educational digitization, this paper examines the logical pathways, typical scenarios, and limitations of artificial intelligence (AI) empowering university physical education. The study reveals that AI facilitates a shift from experience-driven to evidence-based teaching by reconstructing the "objective-content-evaluation" chain. Through technologies such as smart wearables, VR, and AR, it enables personalized training and real-time feedback. Meanwhile, challenges including technology dependency, resource inequality, and ethical risks are identified. The paper proposes a layered implementation strategy that emphasizes the essence of education, aiming to promote the systemic reform of physical education and the holistic development of individuals.

Keywords: AI-enabled, university physical education, educational reform, logical pathways, typical scenarios.

1. Introduction

Driven by the dual strategies of "Healthy China 2030" and educational digitization, the reform of physical education in universities is facing the imperative to transition from "traditional skill training" [1] to "comprehensive competency cultivation." The Opinions on Comprehensively Strengthening and Improving School Sports Work in the New Era explicitly states the need to "deepen teaching reform and strengthen technological support" to enhance students' physical health and lifelong sports awareness (General Office of the State Council, 2020) [2]. With the explosive growth of domestic large AI models like DeepSeek and WuDao in 2025, China's artificial intelligence technology has entered a phase of independent innovation and breakthrough, providing a new technological paradigm and tool support for reconstructing educational scenarios [3].

However, three major practical dilemmas persist in current university physical education curricula: Firstly, teaching models are monotonous, overly reliant on teacher demonstrations and student repetition, making it difficult to meet personalized needs. Secondly, the evaluation system is rigid, with static assessments primarily based on "standardized tests" neglecting core competencies such as exercise habits and psychological resilience. Thirdly, course resources are unevenly distributed; universities in underdeveloped regions struggle to achieve high-quality physical education due to shortages in equipment and teaching staff [4].

Simultaneously, the rapid development of digital-intelligent technologies (such as AI, big data, VR/AR) offers new pathways to address these challenges. For example [5], smart wearable devices can monitor student sports data in real-time and dynamically optimize training plans; VR technology can simulate complex sports scenarios to enhance skill acquisition efficiency. However, existing research predominantly focuses on the digital-intelligent transformation of general educational settings, with

systematic exploration in the specific field of physical education remaining insufficient. This is manifested in two key aspects: On one hand, the integrative logic between digital-intelligent technologies and physical education teaching has not been fully clarified. Technological applications often remain at the level of tool substitution, lacking in-depth analysis of the holistic reconstruction of the "objective-content-evaluation" chain. On the other hand, the limitations of practical application scenarios (e.g., technological dependency, data ethics) have not been adequately revealed, which can easily lead reforms into the misconception of "prioritizing technology over education."

In recent years, research on digital-intelligent empowerment in education has evolved along two main lines: The first is the technology-driven educational transformation path. Scholars generally agree that digital-intelligent technologies reconstruct the teaching process through a "data collection-analysis-decision" closed loop, such as personalized recommendations based on learning profiles and intelligent tutoring systems featuring human-computer collaboration. Liu et al. further proposed a four-dimensional logical framework of "objective-means-subject-scenario," [6] emphasizing the need for technology to dynamically adapt to educational needs. The second line is the exploration of the digital transformation of physical education curricula. Some studies have validated the effectiveness of wearable devices in sports monitoring or used VR technology to enhance student sports participation, but these are mostly case analyses of single-technology applications, lacking systematic discussion on the logic and risks of reform.

Notably, significant gaps exist in current research: Firstly, a cross-disciplinary theory integrating "education and sports" for digital-intelligent empowerment has not been established. How technology adapts to the particularities of physical education (e.g., its dynamic nature, physical embodiment) [7] requires further investigation. Secondly, the conclude of typical scenarios is mostly confined to the teaching process, with insufficient attention paid to scenarios such as

curriculum management and interdisciplinary integration. Thirdly, discussions on technological limitations primarily focus on general educational ethics (e.g., data privacy), failing to analyse specific risks (e.g., misuse of sports data) [8] in the context of physical education teaching practice.

The theoretical value of this paper lies in constructing an integrative analytical framework for "digital-intelligent empowerment of university physical education reform." It moves beyond a purely instrumental view of technology, revealing the deep interactive mechanisms between digital-intelligent technologies and physical education from three dimensions: logical pathways, scenario innovation, and limitations. On a practical level, by analyzing implementation cases of typical scenarios such as intelligent teaching and data management, it provides universities with reusable reform pathways. Concurrently, it proposes a tiered advancement strategy to address challenges like technological dependency and ethical risks, facilitating the steady implementation of digital-intelligent transformation.

2. The Logical Pathway of AI-Enabled Reform in University Physical Education

Empowerment theory (also known as enabling theory or the theory of stimulated capacity) first appeared in Solomon's *Black Empowerment: Social Work in Oppressed Communities*. Here, "empowerment" refers to endowing individuals or groups with certain abilities or power. In sociology, this theory was initially applied in the fields of "social action" or "self-help," and later gradually came to describe disadvantaged groups in society, particularly helping them enhance their self-control capabilities. The key to empowerment lies in enabling those without power to gain the capacity for action through various means [9]. In the fields of business and management, empowerment typically refers to granting employees or customers more rights and autonomy, allowing them to become part of the enterprise's value creation. In recent years, with the rapid development of technology, forms of technological empowerment have continuously emerged, such as AI empowerment, digital empowerment, and platform empowerment. Technological empowerment refers to enhancing the capabilities of a group or individual through technological means such as digitization, networking, and intelligence. It has been widely applied in disciplines such as psychology, management, education, and medicine. The core of technological empowerment lies in the alignment between technology and application scenarios, using technological means to enhance individual capabilities. AI-enabled reform in university physical education not only focuses on the application of technological innovation but also emphasizes the enhancement of relevant stakeholders' capabilities post-empowerment. Its ideal goal is to optimize educational scenarios through the involvement of artificial intelligence in higher education, thereby expanding the development space of relevant stakeholders and creating new value.

Based on existing research, this paper organizes the fundamental logic of AI-enabled reform in university physical education, primarily exploring three aspects: "objectives, subjects, and scenarios" to address questions such as "why empower," "with what to empower," "for whom to empower," and "how to empower". First, in terms of empowerment objectives, the core goal of AI-enabled reform in university

physical education is to promote the high-quality development of the reform, advance the modernization of physical education, and contribute to the national goal of building a leading sports nation. Second, to minimize potential negative impacts of technology (such as inequity, risks, and threats), AI as an empowerment tool should adhere to ethical standards, be lawful and compliant, and possess robustness. Third, in terms of empowerment subjects, schools, students, and teachers are the three main stakeholders in AI-enabled reform in university physical education. Finally, regarding empowerment scenarios, AI-enabled reform in university physical education integrates with the educational functions of schools (such as talent cultivation, knowledge production, and social services). Targeting stakeholders like students, teachers, and schools, the involved scenarios include learning support, academic research, and disciplinary development. Trustworthy AI in the field of education, as an empowerment tool, closely aligns with the needs of university physical education reform, forming a flexible, intelligent, and sustainable reform ecosystem.

(1) The Core Objective of AI Empowerment: Advancing the Development of a Leading Sports Education Nation through Higher Education

With the advent of the intelligent era, the rapid advancement of information technology has become a crucial factor in enhancing national competitiveness. Many developed countries worldwide regard artificial intelligence as a key initiative to strengthen their national competitive edge. Seizing this developmental trend and cultivating innovative talents has become an essential mission for higher education reform in the intelligent age. Chinese higher education has long been committed to building a strong higher education system. Although it has entered the stage of massification, there remains a gap in achieving the goal of becoming an education powerhouse. Therefore, higher education institutions must seize the opportunities presented by the development of new-generation artificial intelligence technologies. By leveraging intelligent technologies to empower higher education, they can promote high-quality reforms in physical education and achieve the goal of modernizing higher education.

Universities, recognized as the core force driving technological revolutions and industrial transformation, play a pivotal role in technological innovation. With the progress of technology, particularly the development of emerging technologies such as artificial intelligence, universities must not only focus on innovation in education and teaching in the field of physical education but also break through traditional teaching models. Strengthening the application of AI technology in physical education teaching, enhancing foundational research, improving disciplinary development, and fostering talent cultivation are essential to advancing the modernization of physical education. This will provide robust support for cultivating innovative talents in sports.

Empowered by artificial intelligence, physical education teaching can better meet the individualized and diverse needs of students. Universities can offer more precise and customized teaching content, enriching the instructional methods of physical education through technologies such as smart wearable devices, virtual reality (VR), and augmented reality (AR). Particularly in the reform of physical education in higher education, AI empowerment can not only enhance students' physical fitness but also boost their interest in sports, cultivate teamwork spirit, and improve their social skills.

Supported by intelligent technologies, universities can innovate their physical education teaching methods and achieve improvements in teaching effectiveness.

Moreover, AI can assist universities in optimizing the assessment system for physical education courses, achieving a more comprehensive and equitable evaluation approach. Through real-time tracking and analysis of students' sports performance using intelligent equipment, teachers can gain a thorough understanding of each student's learning progress and physical changes. This enables targeted feedback and guidance, promoting students' holistic development. This technology-assisted assessment system will contribute to the comprehensive development of higher education physical education, support the goal of building a leading sports nation, and simultaneously enhance the quality and efficiency of physical education teaching.

(2) Trustworthy Artificial Intelligence as a Key Driver in Empowering Higher Physical Education Reform

Artificial intelligence, which provides powerful impetus for educational transformation and development, serves as a vital engine for driving economic and social progress. In the field of physical education, AI is regarded as capable of redefining all aspects of teaching, management, and assessment. It profoundly alters the ways teachers and students interact and how students learn within physical education, thereby giving rise to entirely new educational models and forms. Specifically, as an advanced technology, AI refers to the research and development of theories, methods, technologies, and application systems designed to simulate, extend, and enhance human intelligence. Intelligent behaviors—including rational thinking, perceptual capabilities, and emotional responses—are realized through a series of core technologies such as data mining, natural language processing, speech recognition, and computer vision. These technologies collectively foster the formation of an AI application ecosystem through continuous interaction and optimization. In physical education, the deep application of AI is often manifested in the form of "AI as a service," helping schools achieve real-time data perception, seamless data flow, and comprehensive analysis in teacher-student interactions and Internet of Things (IoT) connectivity.

For higher physical education, the application of AI provides teachers and students with personalized, customized, and real-time learning experiences, thereby establishing a more intelligent interactive mode. This transformation not only enhances the efficiency of physical education teaching but also assists students in receiving personalized training and guidance tailored to their individual needs. Simultaneously, in the sustainable development of higher education, trustworthy AI is regarded as a core technological engine of digital transformation in education, holding significant importance. Ensuring the trustworthiness of AI in physical education teaching is crucial to guaranteeing its effectiveness in the field.

In practice, despite its potential to transform and reshape the educational ecosystem, the application of AI in physical education may also face certain technological and ethical challenges. For instance, social ethical issues such as privacy breaches, changes in teacher-student relationships, and shifts in peer interaction may arise in the context of AI integration into teaching processes. Excessive reliance on algorithmic recommendations could lead to information isolation or narrow learning interests, while immersion in virtual teaching environments may impact students' attention spans and critical thinking. Therefore, the application of AI in higher

physical education must adhere to the following principles: First, ethical requirements, ensuring the subjectivity of teachers and students, fairness in technology access, transparency of algorithms, and that the integration of AI and education is safe, transparent, reviewable, and traceable. Second, legitimacy, complying with relevant laws and regulations such as personal information protection, network data security, and intellectual property rights. Third, compliance, ensuring that the use of AI is based on students' physical and mental health, aligned with cognitive development laws, and supportive of teachers' professional growth. Finally, robustness, ensuring that AI systems in educational processes can operate stably in dynamic environments, with essential system stability, adaptability, and anti-interference capabilities.

At this stage, the application of AI in sports education must emphasize reliability, transparency, and trustworthiness in practice. Through these measures, high-level physical education can benefit from the positive interaction of well-applied AI, advancing the modernization of physical education and enhancing overall educational quality.

(3) Student Growth, Teacher Development, and Institutional Transformation as Key Dimensions in Driving University Physical Education Reform

From the historical perspective of technology-driven educational transformation, student growth, teacher development, and the upgrading of the school environment constitute the core value of technology-empowered education. Students are the main subjects of education, teachers are the central force guiding student learning, and schools serve as the venues where teaching and learning, daily life, and work take place, while also providing support and services to both teachers and students. These three elements form an organic whole in university physical education. Therefore, the fundamental logic of AI-empowered university physical education lies in continuously interacting with educational scenarios to empower the three main stakeholders—students, teachers, and schools—thereby promoting the holistic development of the university physical education ecosystem.

The functions of AI in physical education can be manifested in the following aspects: First, it helps students acquire personalized knowledge in physical education, supports autonomous learning during the process, improves the accuracy and real-time nature of assessment, and thereby fosters student growth. For example, AI technology can tailor personalized exercise training plans based on students' physical conditions and progress, helping them improve motor skills and enhance physical fitness, while also providing instant feedback. Simultaneously, AI empowers teacher development. Artificial intelligence can not only assist teachers in achieving differentiated teaching, precise instruction, and human-computer collaborative teaching but also support their professional growth. Throughout the teaching process, AI helps teachers implement differentiated and precise teaching strategies as well as human-computer collaboration. By utilizing intelligent tools, teachers can better update their teaching philosophies, reshape their instructional roles, and enhance their teaching competencies, enabling them to respond more flexibly to students' diverse needs during instruction and fostering their professional development. On this foundation, AI also supports the upgrading of physical education environments. It can transform the spatial layout of physical education instruction, optimize educational management and service processes, and

promote institutional transformation. For instance, physical education scenarios can be enhanced through VR (Virtual Reality) and AR (Augmented Reality) technologies to increase student interactivity and engagement, making the learning experience more dynamic and diverse.

Beyond its traditional educational attributes, higher physical education reform also requires special attributes such as service-oriented and research-oriented functions. Cultivating high-quality talents for society and undertaking the reproduction of knowledge and culture are among the important functions of higher education. When empowering university physical education reform with AI, attention must be paid to the following dimensions: At the student level, SMART (Specific, Measurable, Achievable, Relevant, Time-bound) approaches can support students' career development, helping them gain greater competitiveness in the future job market. At the teacher level, AI can not only alleviate the teaching burden but also continuously enhance their academic capabilities and support their research work. At the institutional level, AI promotes the adjustment and upgrading of the physical education system, the reform of talent cultivation models, and the advancement of research methodologies, thereby helping universities achieve a comprehensive transformation in education and research.

Through this series of empowerment measures, AI can drive the in-depth development of university physical education reform, promote the common growth of students, teachers, and institutions, and provide powerful momentum for the modernization of physical education.

3. Typical Scenarios of AI-Empowered University Physical Education Courses

The teaching model of university physical education courses has undergone profound changes under the empowerment of digital-intelligent technologies, with many typical scenarios gradually being applied in teaching. These technologies not only optimize teaching effectiveness but also provide a more personalized and refined learning experience, promoting the comprehensive development of students in terms of physical fitness, motor skills, and psychological qualities.

(1) Personalized Training and Health Management

Smart wearable devices such as smartwatches and fitness trackers have become important teaching tools in modern physical education courses. By monitoring students' physiological data—such as heart rate, step frequency, and exercise intensity—in real time, teachers can gain a comprehensive understanding of their physical condition. This data not only helps teachers formulate appropriate training plans for students but also allows for targeted adjustments based on individual differences, ensuring that training is both purposeful and tailored. Moreover, based on students' sports data, health management systems can dynamically adjust training content, thereby promoting improvements in students' physical fitness and athletic abilities while effectively preventing sports-related injuries.

(2) Application of Virtual Reality (VR) and Augmented Reality (AR) in Motor Skill Learning

Virtual Reality (VR) and Augmented Reality (AR) technologies have infused new vitality into physical education teaching. By simulating highly immersive sports scenarios, these technologies enable students to engage in

complex motor skill training without the need for real-world sports venues. For example, students can practice running, swimming, or basketball in virtual environments, thereby enhancing the efficiency of skill acquisition. AR technology assists students in precisely adjusting their body positions, improving their sports performance through real-time feedback and movement correction.

(3) Intelligent Evaluation and Feedback Mechanisms

Traditional physical education evaluation methods often focus solely on standardized tests, with long evaluation cycles and limited reflection of students' sports performance. Leveraging artificial intelligence and big data technologies, digital-intelligent physical education enables real-time, comprehensive, and multi-dimensional evaluation of student performance. Through real-time collection of student sports data via smart devices, the system can comprehensively assess students' motor skills, physical fitness, and psychological qualities, providing immediate feedback. Based on each student's specific performance, the system offers personalized improvement suggestions during the teaching process, helping students continuously adjust their learning strategies and achieve greater personal progress [10].

(4) Intelligent Tutoring and Human-Machine Collaborative Teaching

Based on students' learning progress and sports performance, intelligent tutoring systems provide personalized teaching support. In this human-machine collaborative teaching model, AI not only offers real-time and accurate guidance to students but also assists teachers in their instructional work. By monitoring students' sports data in real time, the intelligent system alerts teachers to adjust teaching content and pace, ensuring optimal teaching effectiveness. Additionally, by analyzing students' learning data, the system provides teachers with more targeted teaching suggestions, making classroom management more efficient and further improving overall teaching quality.

(5) Data-Driven Course Management and Decision Support

Digital-intelligent technologies provide a new decision-support platform for managing university physical education courses. Schools can use data analysis systems to evaluate the effectiveness of their courses and make corresponding adjustments to students' fitness tests and sports participation, thereby gaining a clear understanding of course effectiveness. The system calculates aspects such as student training progress, enrollment, and participation rates, ensuring that each student maximizes their learning outcomes within appropriate teaching schedules. This enables real-time optimization of student learning and ensures that every student achieves tangible results. Furthermore, the data platform provides important decision support for schools in areas such as the allocation of sports resources, teacher scheduling, and optimization of teaching venues, improving the efficiency of overall educational resource utilization and contributing to the school's operational effectiveness and efficiency.

(6) Interdisciplinary Interactive Physical Education

Digital-intelligent technologies not only promote technological innovation in physical education courses but also foster integration between disciplines. By combining fields such as psychology and nutrition, a comprehensive physical education system is established to meet students' multi-dimensional needs. Through intelligent analysis of students' sports and psychological data, teachers can provide

more holistic guidance, helping students enhance psychological resilience and improve teamwork skills while engaging in physical exercise. This interdisciplinary, interactive teaching approach not only strengthens students' comprehensive qualities and social adaptability but also significantly contributes to the improvement of their motor skills.

Through the implementation of these typical scenarios, digital-intelligent technologies provide students with a personalized and intelligent learning environment, optimizing the efficiency and effectiveness of university physical education teaching. The digital-intelligent education model promotes the modernization of physical education, comprehensively enhancing students' motor skills, physical fitness development, and overall qualities.

4. Limitations of AI-Empowered Physical Education Reform

Although the application of digital-intelligent technologies in university physical education has brought transformative impacts, especially through artificial intelligence (AI), big data, and virtual reality (VR) [11], there remain significant limitations in practical implementation. These constraints are primarily manifested across various dimensions, including technology, ethics, education, resources, and policy. The following sections discuss these core limitations in detail.

(1) Maturity and Accessibility of Technology Application

Currently, the application of digital-intelligent technologies in physical education teaching is still in a developmental stage. While these technologies hold immense potential, their maturity and stability have not yet reached an ideal level. Many AI systems and smart devices may encounter errors during data collection and analysis, thereby affecting the accuracy of teaching outcomes. For instance, real-time sports data monitoring relies on high-quality equipment and precise algorithms. However, in practice, issues such as inaccurate data processing or delayed feedback may arise due to technological immaturity. Moreover, the widespread adoption of digital-intelligent technologies faces high costs, particularly for universities with limited funding. The lack of sufficient budgets to provide adequate technological support for all teaching aspects further exacerbates the unequal distribution of educational resources.

(2) Ethical Risks and Privacy Protection

In physical education teaching, health data such as athletic performance, heart rate, and step frequency involve students' privacy and require careful collection and analysis. Improper data management could lead to ethical issues such as privacy breaches and data misuse. A particularly serious concern is the potential for unfair practices during teaching, which the application of AI technology might exacerbate. For example, algorithmic bias during instruction could result in unfair treatment of students from different backgrounds, even affecting their assessment outcomes. Therefore, a crucial issue that must be addressed in digital-intelligent reform is ensuring strict adherence to ethical norms during data collection, storage, and processing to safeguard student privacy. Additionally, over-reliance on AI in sports teaching may undermine students' autonomy and personal development, potentially harming their physical and mental well-being.

(3) Lag in Teacher Perspectives and Competencies

Despite the new opportunities that digital-intelligent

technologies offer for physical education teaching, many physical education teachers still face technological barriers when applying AI in practice. Most university physical education teachers lack training in relevant digital technologies, resulting in insufficient knowledge and skills in applying advanced technologies. This has led some teachers to resist or feel confused about the use of digital-intelligent technologies, with some even failing to recognize the innovative potential these technologies bring to teaching. Furthermore, traditional teaching philosophies still dominate among many teachers, and some are accustomed to conventional teaching methods, making it difficult for them to adapt to rapidly changing educational environments. The lack of technical proficiency and conservative perspectives significantly hinder the effective implementation of digital-intelligent technologies in university physical education teaching. Therefore, enhancing teachers' application skills and promoting a shift in their educational philosophies are key to achieving physical education reform.

(4) Resource Imbalance and Insufficient Infrastructure

Although the application prospects of digital-intelligent technologies in physical education teaching are broad, there are significant disparities in their adoption across different regions and universities. Economically advantaged universities can introduce advanced AI equipment and technologies earlier, while universities with limited funding, particularly those in less developed regions, often face challenges such as equipment shortages and insufficient teaching staff. This imbalance in resource allocation increasingly widens the gap in educational quality and exacerbates issues of educational equity [12]. For universities with limited budgets, introducing high-tech teaching equipment requires substantial financial investment, and the rapid pace of technological updates imposes long-term financial burdens for equipment maintenance and software upkeep. Simultaneously, many schools lack professional technical support teams, making it difficult to implement and maintain these technologies effectively.

(5) Lag in Regulations, Policies, and Sociocultural Adaptability

Existing laws and policies have lagged behind the rapid technological advancements in the digital-intelligent reform of physical education teaching. Current regulations regarding the application of AI and digital technologies in education are underdeveloped, lacking unified guiding principles and standards. In the absence of clear policy support and regulatory mechanisms, the application of AI in education may become irregular or even abused. Another significant factor limiting the promotion of digital-intelligent technologies is societal and cultural acceptance. The level of acceptance of AI technologies varies across regions and cultural contexts. Some groups hold conservative attitudes toward AI and big data technologies, fearing that their introduction may bring employment pressures or changes in social structures. To overcome these challenges, governments, education departments, and universities need to introduce more policies that align with technological development, enhance public awareness and acceptance of digital-intelligent technologies, and strengthen communication and outreach efforts with society.

In summary, although digital-intelligent technologies offer unprecedented opportunities for physical education reform in higher education institutions, Chinese universities currently face numerous unresolved issues in practice, including

technological immaturity, ethical deficiencies, lagging teacher competencies, resource imbalances, and policy delays. A profound analysis and coordinated approach across technological, ethical, educational, and policy dimensions are essential to promote the healthy development of digital-intelligent reform and ensure its smooth implementation and desired outcomes.

5. Conclusion and Recommendations

(1) Digital-intelligent technologies have provided innovative pathways for the reform of university physical education. Specifically, technologies such as artificial intelligence (AI) and big data can effectively address several issues prevalent in traditional physical education, including monotonous teaching models, rigid evaluation systems, and uneven resource allocation. By reconstructing the "objective-content-evaluation" logic chain, digital-intelligent physical education makes the teaching process more personalized and precise. This drives the transformation of physical education courses toward comprehensive competency development and supports the implementation of the "Healthy China 2030" strategy.

(2) The application of digital-intelligent technologies faces multifaceted challenges in technology, ethics, and education. While these technologies bring transformative opportunities to university physical education, their application still has significant limitations. These include insufficient technological maturity, issues with the accuracy of equipment and algorithms, ethical risks such as data privacy protection and algorithmic fairness, and educational challenges like the lack of necessary technical training for teachers. These issues urgently need to be addressed to ensure the smooth advancement of digital-intelligent reform.

(3) Typical scenarios demonstrate the potential of digital-intelligent technologies to enhance teaching efficiency and student engagement. Through technologies such as smart wearables, virtual reality (VR), and augmented reality (AR), digital-intelligent technologies have shown great application potential in areas including personalized training, motor skill learning, intelligent feedback, course management, and interdisciplinary education. These technologies not only improve teaching effectiveness but also enhance student participation and learning interest, providing replicable pathways for the modernization of physical education.

(4) It is recommended to strengthen resource allocation and cross-sectoral collaboration to promote the comprehensive implementation of the reform. To address issues such as resource imbalance and technology dependency in the application of digital-intelligent technologies, it is suggested to enhance support for universities in underdeveloped regions, promote the construction of a "society-school-enterprise"

collaborative ecosystem, and foster the deep integration of technology and education. Simultaneously, attention must be paid to the risks of technology alienation to ensure that, throughout the process of digital-intelligent reform, technology consistently serves the core objective of education: promoting the holistic development of students.

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