

The Logical Rationale and Implementation Pathways for High-Quality Development of University Public Physical Education Courses Empowered by New Quality Productive Forces

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Abstract: *New Quality Productive Forces, led by science and technology and integrated with digital technologies and green development concepts, empower the high-quality development of university public physical education courses. From the perspectives of technology empowerment and health first, this paper analyzes the intrinsic connections between New Quality Productive Forces and physical education curriculum reform. Against the backdrop of monotonous course content, lagging evaluation, and low student participation, it discusses the necessity and feasibility of such empowerment. The implementation pathways are as follows: on the one hand, innovating teaching models by creating "digital technology + physical education" and carrying out curriculum reform through intelligent devices, virtual reality, augmented reality technologies, and online platforms; on the other hand, strengthening the teaching staff by enhancing teachers' digital skills training, so that they become educators with technology-empowerment capabilities. The aim is to elaborate on the promoting role of New Quality Productive Forces in university physical education curriculum reform and to offer constructive suggestions, so as to better serve the construction of Healthy China and a sports powerhouse.*

Keywords: *New Quality Productive Forces, university public physical education courses, high-quality development, teaching model innovation, teaching staff development.*

Introduction

New Quality Productive Forces represent a new type of productive force led by scientific and technological innovation and characterized primarily by digitalization and intellectualization, playing a significant role in promoting high-quality development across various industries. At present, university public physical education courses face problems such as monotonous teaching methods, rigid assessment approaches, and low student motivation, and their high-quality development requires new driving forces and technical support^[1]. The features of New Quality Productive Forces, including digital transformation, cross-sector collaboration, and innovation-driven growth, provide possible pathways to address the issues encountered in the development of university public physical education courses. The integration of the two is not only necessary for universities to actively respond to the national call for developing New Quality Productive Forces, but also essential for the reform of physical education teaching.

Research on how New Quality Productive Forces promote the high-quality development of university public physical education courses has significant theoretical and practical significance. Theoretically, this study helps to expand the application scope of New Quality Productive Forces, enrich the theoretical content of high-quality physical education, and provide theoretical support for the application of New Quality Productive Forces in the education sector; in practice, it can leverage New Quality Productive Forces to enable university public physical education courses to be designed according to students' needs, conduct real-time monitoring and timely feedback during class sessions, and carry out objective assessments of learning outcomes, thereby improving the quality of physical education teaching, cultivating students' core literacy in physical education, and fostering their habit of regularly participating in sports activities.

This study explores the logical rationale and implementation pathways for New Quality Productive

Forces empowering the high-quality development of university public physical education courses, based on the attributes of New Quality Productive Forces and the developmental laws of physical education. Empowering various industries with New Quality Productive Forces requires a process of "technology penetration, model reconstruction, and value enhancement," and this process can also serve as a reference for empowering physical education^[2]. It further explores the relationship between New Quality Productive Forces and university public physical education courses, as well as how to effectively leverage digital technologies in classroom teaching, so as to better promote the high-quality development of university physical education.

1. The Connotation and Significance of New Quality Productive Forces Empowering the High-Quality Development of University Public Physical Education Courses

1.1 The Connotation of New Quality Productive Forces

New Quality Productive Forces are a new form of productive forces centered on scientific and technological innovation and integrated with digital technologies and green development concepts. They primarily refer to the qualitative changes in productive forces brought about by the technological revolution and various factor transformations. In essence, New Quality Productive Forces differ from previous productive forces that relied on basic material conditions such as natural resources; instead, they place greater emphasis on data, algorithms, and intelligent robots as the primary new production factors to improve production efficiency and promote economic development^[3]. They represent a new contemporary concept proposed on the basis of inheriting and developing Marxist productive forces theory, and the ideas of green development, intelligence, and collaboration embodied therein also point the way for the development of various industries.

The connotation of New Quality Productive Forces can be understood from two aspects: at the technological level, emerging scientific and technological forces represented by digital technologies, artificial intelligence, and the Internet of Things serve as the primary driving force, overcoming the spatial and temporal limitations of traditional production through technology and making production activities more precise and efficient; at the value level, the goal is oriented toward the comprehensive development of human beings, emphasizing the alignment of productivity development with environmental protection and social equity and justice, which is precisely the principle of "harmonious coexistence between humanity and nature" advocated in Marx's ecological productive forces theory. For example, in the education sector, the technological aspect of New Quality Productive Forces can be manifested through forms such as smart classrooms to promote educational and teaching reform, while the value aspect provides guiding principles for advancing the better and faster development of the education sector.

1.2 The Significance of Empowering the High-Quality Development of University Public Physical Education Courses

Promoting the high-quality development of university public physical education courses through New Quality Productive Forces is an essential pathway for higher education to adapt to the new trends of socio-economic development and to advance the modernization of physical education. New Quality Productive Forces, as a new type of productive forces led by science and technology, can break through the temporal, spatial, and resource constraints of traditional public physical education courses when applied in physical education. With the help of intelligent devices and digital platforms, they redefine the classroom and provide students with more personalized and targeted exercise and health services, which is conducive to the direction of educational informatization reform and also beneficial to improving the teaching quality and effectiveness of public physical education courses^[4]. University public physical education courses serve as an important platform for cultivating students' physical fitness and sports literacy, and they influence students' comprehensive and long-term development to a certain extent. The empowerment of New Quality Productive Forces can transform public physical education courses from the original "teacher-centered" model to a "student-centered" one.

New Quality Productive Forces facilitating the high-quality development of university public physical education courses is of great significance for implementing the national strategy for nationwide fitness and improving the people's physical health. University public physical education courses are part of public sports services, and their continuous progress in the development process can drive the development of the entire social sports sector. By guiding students to establish sound concepts

of physical exercise, they can become participants in future sports activities. Meanwhile, the technological support brought by New Quality Productive Forces can connect sports resources within schools with those in society, making sports services more adequate and accessible^[5].

The significance of New Quality Productive Forces for the high-quality development of university public physical education courses lies in serving the consistency between the educational essence of higher education in cultivating people and its value of serving society. Relying on new technologies, organically integrating the two in teaching enables public physical education courses to not only improve students' physical health, but also cultivate their innovation ability and team spirit, laying a foundation for talents needed by New Quality Productive Forces, promoting a virtuous cycle between education and the economy and society, and advancing the development of physical education in the new era.

2. The Logical Rationale for New Quality Productive Forces Empowering the High-Quality Development of University Public Physical Education Courses

2.1 Theoretical Logic: Theoretical Foundations and Support

The internal mechanism through which New Quality Productive Forces promote the high-quality development of university public physical education courses needs to establish a supporting system on a certain foundation. New Quality Productive Forces are a new form of productive forces led by science and technology and integrated with digital technologies and green development. On this basis, improving production and product quality through innovation and the reorganization of technological factors is a basic characteristic of New Quality Productive Forces, which lays the foundation for the high-quality development of public physical education courses. Digital economy theory emphasizes the integration of data factors with traditional industries, which can better promote high-quality development in education. For example, using intelligent devices to collect information on students' exercise performance and formulate targeted exercise plans reflects the idea of refined and efficient management of teaching activities.

The theory of high-quality development of higher education points the way for New Quality Productive Forces to empower public physical education courses, emphasizing a student-development-oriented approach and relying on the reform of educational and teaching methods as well as the rational allocation of educational resources to improve teaching quality. For New Quality Productive Forces to integrate with the high-quality development of higher education, public physical education courses need to undergo innovations in teaching objectives, content, and methods, such as employing virtual reality (VR) for experiential physical education teaching, or analyzing students' physical fitness conditions based on big data to improve the curriculum^[6].

The technology empowerment theory further elaborates the supporting role of New Quality Productive Forces for public physical education courses, that is, technological progress can free traditional teaching methods from the constraints of time and space, making teaching resources more accessible and shareable. For example, online physical education course platforms can enable students to access high-quality teaching content at any time and place, and teachers can also use devices such as mobile phones to monitor students' exercise performance and provide corresponding suggestions.

The theoretical logic for New Quality Productive Forces empowering the high-quality development of university public physical education courses is the result of the combined effects of digital economy theory, the theory of high-quality development of higher education, and technology empowerment theory. These three theories play a significant guiding role in the high-quality development of public physical education courses in terms of technology, value orientation, and implementation pathways respectively, transforming the traditional experience-based teaching into the current information-based, personalized, and precise physical education instruction.

2.2 Practical Logic: Realistic Needs and Driving Factors

The practical logic for New Quality Productive Forces to facilitate the high-quality development of university public physical education courses is first and foremost rooted in the practical needs of university public physical education teaching. At present, the problems existing in university public physical education courses are overly monotonous teaching content, a single evaluation method, and low student participation. Traditional teaching approaches cannot adequately address students'

individualized exercise needs or achieve the goal of improving physical fitness. In this context, New Quality Productive Forces, with the help of advanced technologies such as artificial intelligence and big data, can effectively resolve these issues.

The integration of New Quality Productive Forces with university public physical education courses lies in the joint effect of technological progress and the transformation of educational concepts. On the one hand, with the development and refinement of technologies such as artificial intelligence and virtual reality, it becomes possible to reshape the teaching scenarios of public physical education courses and enhance interactivity; on the other hand, the education sector currently has a deeper understanding of being "student-centered," which emphasizes individualized instruction according to students' aptitudes, and this requires corresponding technological means of New Quality Productive Forces to realize^[7].

New Quality Productive Forces also facilitate the practice of university public physical education courses in terms of effective resource utilization and teaching quality improvement. Traditional public physical education courses, constrained by factors such as venues, equipment, and teaching staff, cannot achieve large-scale personalized teaching, whereas New Quality Productive Forces, through digital means, aggregate excellent teaching resources. Moreover, with technological support, information during the teaching process can be fed back to teachers in a timely manner, enabling them to understand students' conditions and make corresponding adjustments, thereby enhancing the overall teaching effectiveness of the classroom. This not only meets the actual needs of public physical education courses but also constitutes an important manifestation of New Quality Productive Forces promoting high-quality development in education.

3. Implementation Pathways for New Quality Productive Forces Empowering the High-Quality Development of University Public Physical Education Courses

3.1 Pathways for Teaching Model Innovation

The key to innovating the teaching model of university public physical education courses through New Quality Productive Forces lies in utilizing new technologies and new mechanisms to make teaching more precise, personalized, and dynamic. At present, one problem faced by university public physical education courses is the homogenization of teaching content and the uniformity of teaching methods. The technological means relied upon by New Quality Productive Forces, such as digital tools and intelligent devices, can address these issues. On this basis, relevant equipment such as motion sensors and AI motion recognition systems can be used to obtain students' exercise information, and teaching arrangements and course content can be adjusted in a timely manner based on the corresponding information. Thus, the teaching approach shifts from a "one-size-fits-all" model to "tailored instruction for each student," which not only helps to increase students' motivation to exercise but also allows data feedback to be used to measure teaching effectiveness.

The innovation of teaching models must adopt a blended teaching approach that combines online and offline instruction through "technology empowerment plus scenario reconstruction." Online, virtual simulation technology can be used to build immersive sports environments, such as virtual running tracks and simulated ball games, allowing students to practice technical skills and tactical coordination; offline, intelligent devices can be combined with actual venues to enable real-time transmission and analysis of exercise data, forming a complete teaching process of "virtual training, actual practice, and feedback on results." This teaching model innovation, characterized by new technological attributes, breaks the constraints of time and space. It not only helps to increase the diversity of teaching content but also, through information sharing, eliminates barriers between different subjects and grade levels, thereby building a seamlessly connected physical education ecosystem.

The core of teaching model innovation lies in having a flexible and student-centered adjustment approach, closely integrating the application of technology with the needs of teaching. The teaching model under the new technological context is not a mere accumulation of technology, but rather the use of technology to stimulate students' learning motivation and interest. For example, through big data analysis to understand students' preferences, appropriate learning content and plans can be provided to them; there should also be communication channels between teachers and students, so that online platforms can promptly answer questions raised by students, making teaching a two-way interaction rather than one-way indoctrination. In terms of actual effects, teaching innovation is conducive to improving teaching quality. After a school adopted an AI-assisted teaching system, students' sports skill

levels improved by 25%, and their evaluation of the course reached 92%. This shows that the teaching reform brought by new technologies is a process that promotes the effective allocation of educational resources through technological means, thereby enabling university public physical education courses to develop to a higher level.

3.2 Pathways for Strengthening the Teaching Staff

A key link for New Quality Productive Forces to promote the high-quality development of university public physical education courses is the construction of the teaching staff, and the most important aspect is to transform teachers from traditional skill instructors into technology-integrated educators. Generative AI such as ChatGPT can serve as an auxiliary tool for the professional development of future physical education teachers, playing a role in simulating teaching environments, generating personalized practice plans, and providing timely guidance, enabling teachers to more quickly understand how to apply the relevant technologies of New Quality Productive Forces. For example, using AI to set up virtual teaching environments allows teachers to practice using smart sports facilities in simulated real-life settings, thereby enhancing their technology integration capability, which in turn facilitates the incorporation of intelligent monitoring, data analysis, and other elements into future teaching processes.

The experience of the Guangdong-Hong Kong-Macao Greater Bay Area public innovation platforms in promoting the development of New Quality Productive Forces in enterprises inspires us that cross-entity collaboration is an effective way to integrate resources and enhance capabilities^[8]. The cultivation of the teaching staff for university public physical education can also learn from this approach by establishing an intercollegiate sports technology teaching and research alliance, which brings together university physical education departments, smart sports enterprises, and educational technology institutions to develop training course content. The alliance can conduct specialized training in areas such as sports data collection and processing, the application of virtual reality (VR) and augmented reality (AR) in physical education teaching, and AI-assisted sports injury prevention and control. At the same time, it can establish a technology exchange platform to promptly release the latest teaching tools and case materials related to New Quality Productive Forces for teachers' use, thereby forming a community of technological application.

To strengthen the teaching staff, it is necessary to establish a sound dynamic performance evaluation and incentive system for teachers. Universities should incorporate teachers' technological application capabilities as an important criterion in professional title evaluation and teaching assessment. When evaluating professional titles, factors such as the design of smart physical education courses and personalized analysis reports on students' exercise performance may be considered. In addition, special research funds should be established to support teachers in conducting research on the integration of New Quality Productive Forces with physical education teaching, enabling them to consolidate their practical experience in technology application into research outcomes. Through evaluation and incentives, teachers are encouraged to consciously embrace the teaching empowerment of New Quality Productive Forces, thereby cultivating outstanding educators who meet the demands of the new era.

4. Conclusion

The empowerment of university public physical education courses by New Quality Productive Forces for high-quality development is a beneficial exploration in the education sector to actively respond to national strategies. In essence, it leverages new technologies, new models, and new concepts to transform university public physical education courses from the traditional skill transmission into a combination of "health literacy cultivation, personalized development, and digital management." Both the technological and value attributes of New Quality Productive Forces can help address the problems faced by public physical education courses, such as low student motivation, difficulty in measuring teaching effectiveness, and unreasonable resource allocation. In practice, this is not merely the application of technological means, but also a shift in educational philosophy, transforming students from the former "course objects" into the current "subjects of exercise," thereby enabling public physical education courses to better serve the goals of students' physical health growth and the cultivation of good exercise and lifestyle habits.

Research on the empowerment of New Quality Productive Forces for the high-quality development of university public physical education courses also needs to pay attention to the alignment between

technological application and educational laws. Future research can focus on the relationships among "technology, teaching, and students." For example, it can establish student physical ability profiles based on big data to modify teaching content, or utilize virtual reality technology to create immersive sports experiences to enhance students' learning motivation. In addition, efforts should be strengthened to cultivate teachers' information technology proficiency so that they can master the application of new technologies, thereby better serving educational and teaching work.

Research on the empowerment of New Quality Productive Forces for the high-quality development of university public physical education courses is a micro-case of high-quality development, and it has important implications for the high-quality development of universities. Research on its logical rationale and implementation approaches can not only supplement and refine the relevant theories of applying New Quality Productive Forces in the education field, but also provide useful references for the high-quality development of other disciplines. Moreover, with the continuous integration of information technology and education, future public physical education courses will undergo reform and development toward more precise, personalized, and lifelong directions. In this process, New Quality Productive Forces will play a decisive role, thereby further enhancing the status of public physical education courses in school education and ultimately serving the fundamental purpose of "educating through sports" as well as the needs of national strategies.

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