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Research on the Innovative Development of College Physical Education Teaching in the Era of Artificial Intelligence

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Abstract: In the new era featuring rapid development of artificial-intelligence technology and comprehensive implementation of digital education, traditional college physical-education teaching methods have certain drawbacks. They can hardly satisfy the personalized physical-learning demands of college students in the new era, and fail to achieve the high-quality development goals of college physical-education talent cultivation. Leveraging technical strengths including data collection, intelligent analysis, virtual simulation and precise adaptation, artificial intelligence provides new approaches and technical support for the reform and innovation of college physical-education teaching, and has become a major driving force promoting the modernized, scientific and personalized development of physical-education teaching. This paper sorts out major existing problems in college physical-education teaching in China, and puts forward relevant countermeasures for innovative development according to application advantages and adaptive scenarios of artificial-intelligence technologies. It aims to break bottlenecks of traditional physical-education teaching, construct a new intelligent, personalized and scientific college physical-education-teaching system, so as to comprehensively improve the quality of college physical-education teaching and help college students enhance their physical fitness.

Keywords: Artificial intelligence; College physical education; Physical education teaching

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1. Introduction

The wide application of artificial-intelligence technology breaks temporal-spatial constraints and model shackles of traditional physical-education teaching. With features such as accurate data collection, intelligent analytical judgment, immersive scenario building and personalized scheme formulation, it enables all-round innovation for physical-education teaching: shifting from “unified indoctrination” to “precision-oriented cultivation”, and from “experience-based teaching” to “data-driven teaching”. It offers new technical paths and development possibilities for the reform and innovation of college physical-education teaching. Therefore, starting from the development background of the artificial-intelligence era, this paper conducts an in-depth analysis of major existing problems in college physical-education teaching, and proposes new approaches

for college physical-education teaching adapted to the development of the intelligent era, so as to boost the high-quality development of college physical-education teaching and give play to the educational functions of physical education.

2. Existing problems in college physical education teaching

2.1. Rigid and monotonous teaching modes

At present, most colleges and universities in China still adopt the traditional standardized physical-education-teaching mode, featuring fixed overall teaching procedures, monotonous forms and serious homogenized teaching phenomena. Teachers occupy the dominant position in classroom teaching, and teaching activities mainly follow the workflow of movement demonstration, collective explanation and unified practice. All students receive identical teaching content, training intensity, and teaching rhythm, without taking individual differences among students into consideration [1]. College students show obvious disparities in physical fitness, sports foundation, limb coordination, sports interests and other aspects. Some students with poor sports foundations cannot keep up with classroom-training progress, tend to develop fear-of-difficulty sentiment and further lose interest in physical exercise. For students with strong athletic abilities, monotonous and low-intensity training content cannot bring capability improvement. As a result, college physical-education teaching suffers from a severe lack of relevance and adaptability [2].

Traditional physical-education teaching is greatly restricted by time and space. Most teaching activities are carried out within scheduled hours, and there is no regular guidance or tracking mechanism after class. When students conduct independent after-class exercises, they can hardly correct wrong movements or control exercise load in a timely manner. Thus, classroom-teaching outcomes cannot be consolidated, and physical-education teaching presents a passive situation of “in-class training yet laissez-faire after class”. It fails to realize the educational goal of teaching students in accordance with their aptitude, and cannot meet personalized and diversified physical-learning demands of college students in the new era.

2.2. Outdated and lagging teaching contents

The contents of college physical-education teaching guarantee teaching quality. At present, physical-education curricula in some colleges and universities are updated slowly and are generally outdated, monotonous, and backward, failing to satisfy the developmental requirements of physical-education teaching and student demands in the intelligent era. Current college physical-education courses are still dominated by traditional basic items such as basketball, football, track-and-field and gymnastics. Emerging courses, including fashionable sports, recreational sports, health-care sports, and intelligent sports, only account for a small proportion. They cannot meet diversified and personalized sports-interest demands of contemporary college students, nor effectively stimulate students’ enthusiasm for classroom participation [3].

On the one hand, most physical-education-teaching resources in colleges and universities still rely on offline venues, equipment and textbooks. There is a shortage of digital and intelligent physical-education-teaching resources. High-quality resources such as online teaching videos, virtual-simulation courses and personalized training schemes tailored for various sports items and students of different proficiency levels are insufficient to support the development of online-offline blended teaching [4]. On the other hand, physical-education-teaching resources are unevenly distributed. General physical-education courses face resource shortages and cannot satisfy student demands. Modern physical-education-teaching facilities, including intelligent teaching equipment, wearable

monitoring devices, and smart-playground systems, have low coverage. Consequently, advanced teaching ideas and technologies can hardly be applied to physical-education teaching, making the renewal of physical-education teaching like water without a source or a tree without roots.

2.3. One-sided teaching-evaluation system

Teaching evaluation serves as one of the approaches for inspecting teaching effects and improving teaching procedures. At present, obvious defects exist in college physical-education-teaching-evaluation systems, which cannot comprehensively, objectively and accurately reflect students' physical-learning status and comprehensive qualities. Traditional physical-education-teaching evaluation is dominated by summative assessment. Final grades are mainly assessed through single indicators, including physical-fitness tests, sports-skill examinations, and attendance rates. Excessive emphasis is placed on final assessment results, while manifestations of key qualities such as students' in-class-participation process, training progress, sports attitudes, physical-education spirit and teamwork competence are ignored [5].

Meanwhile, traditional evaluation modes rely on teachers' subjective judgment without support from objective data. Evaluation results carry strong subjectivity and low accuracy. Teachers judge the standardization of students' movements and physical-fitness levels based on teaching experience. They can neither accurately spot minor problems emerging in students' sports processes nor precisely grasp students' deficiencies and weaknesses [6]. In addition, feedback mechanisms for teaching evaluation are seriously backward. Final grades are only released at the end of final examinations. Real-time evaluation, timely feedback and personalized guidance are absent during teaching processes. Students cannot quickly identify and adjust their own problems, and teachers cannot improve teaching methods according to students' changing learning conditions. Hence, the diagnostic, guiding, and improving functions of teaching evaluation are completely lost, failing to promote continuous improvement of teaching quality [7].

3. Countermeasures for innovation of college physical-education teaching in the artificial-intelligence era

3.1. Innovate traditional teaching modes and build a personalized precision-oriented teaching system

First of all, relying on the technical strengths of artificial-intelligence big-data analysis and intelligent-algorithm adaptation, break traditional homogenized-teaching modes and establish a new personalized precision-teaching mode of "data-driven, demand-oriented instruction", so as to solve the lack of pertinence in traditional teaching. Before class, adopt artificial-intelligence systems to investigate students' learning status accurately. Collect comprehensive data, including students' height, weight, physical-fitness indicators, sports foundations, sports interests, and physical weaknesses, by means of wearable devices and physical-fitness-monitoring terminals. Then apply AI algorithms to analyze and classify student data intelligently, dividing students into three groups: basic-level, improvement-oriented and talent-oriented groups, so as to provide data support for stratified teaching and personalized instruction [8].

Secondly, formulate differentiated teaching schemes according to grouping outcomes. For students with weak foundations, focus on basic-movement teaching and physical-fitness-improvement training, and reduce training difficulty and intensity. For intermediate-level students, strengthen standardized-movement training and gradually improve their athletic abilities. For talent-oriented students, add special-skill improvement and

competitive-training content to tap their sports potential. Leverage artificial-intelligence technologies to break temporal-spatial constraints of teaching, build an online intelligent-teaching platform, and push personalized after-class-training tasks and movement-correction videos to students' mobile phones for students to complete exercises in spare time. The AI system captures students' movements in real time and provides automatic error correction services. A closed-loop teaching mode featuring precise in-class guidance and continuous after-class support is realized, which largely meets the personalized-growth requirements of individual students [9].

3.2. Optimize teaching-content systems and build an intelligent teaching-resource platform

Optimize and update college physical-education-teaching contents and enrich curriculum systems in accordance with developmental demands of the artificial-intelligence era and characteristics of college students' physical learning. Establish an intelligently-shared physical-education-teaching-resource platform to address insufficient resource allocation [10]. In terms of teaching contents, retain core contents of traditional physical-education courses. On this basis, add emerging-course contents including intelligent sports, fashionable sports, health-care sports, sports rehabilitation and sports-data analysis, covering yoga, roller-skating, flying-disc, intelligent fitness, posture correction and other items. These contents match college students' sports hobbies and enhance the diversity and interest of curriculum systems. Meanwhile, integrate elements such as physical-health knowledge, sports-injury prevention and scientific-fitness theories to organically combine skill teaching with quality cultivation, and foster students' lifelong-sports concepts [11].

Colleges and universities shall cooperate with scientific-and-technological enterprises and physical-education-specialized institutions to build dedicated intelligent physical-education-teaching-resource libraries. Collect and sort various high-quality digital resources, including virtual-simulation teaching courses, intelli gent-movement-demonstration videos, personalized training schemes, and physical-education-theoretical-knowledge databases, to realize online sharing and on-demand access to teaching resources. Accelerate hardware construction such as smart playgrounds, intelligent-training venues and VR physical-education-simulation classrooms. Adopt AI sports-vision algorithms and intelligent sensors to realize intelligent upgrading of sports scenarios, provide technical support for immersive teaching and independent training, and thoroughly solve the problems of monotonous supply and shortage of traditional teaching resources [12].

3.3. Reconstruct a multi-dimensional evaluation system and realize whole-process dynamic evaluation

Leverage the advantages of artificial intelligence in data collection and intelligent analysis to break traditional summative one-sided evaluation modes. Construct an intelligent multi-dimensional evaluation system combining process-oriented evaluation, summative evaluation and comprehensive-quality evaluation to make physical-education-teaching evaluation comprehensive, accurate and scientific. First of all, conduct all-round monitoring of students' in-class attendance, training duration, exercise load, movement standardization, in-class participation degree, and after-class exercise frequency. Keep track of students' learning and training status in a timely manner, and acquire students' physical conditions via campus smart-physical-education platforms and wearable devices, so as to realize whole-process management of students' learning outcomes [13].

Secondly, in terms of summative evaluation, break the previous assessment mode solely based on physical-fitness results. Comprehensively assess students' athletic capabilities by combining various data accumulated in daily processes, final skill-test scores and physical-fitness-test scores, avoiding result

deviations caused by single examinations. In addition, add comprehensive-quality evaluation. The AI system evaluates students' comprehensive physical-education qualities in combination with their in-class teamwork, sportsmanship, progress and innovative exercise modes. Furthermore, establish a real-time feedback-evaluation mechanism. Artificial intelligence generates weekly and daily analytical reports on students' physical-learning data, accurately identifies students' movement weaknesses, physical-fitness deficiencies and training problems, and immediately puts forward improvement suggestions. Teachers adjust teaching schemes according to evaluation data and deliver personalized guidance, so as to maximize the diagnostic and improving functions of teaching evaluation.

3.4. Strengthen teaching-team construction and improve intelligent-teaching competence

The intelligent literacy of teaching staff serves as a major guarantee for promoting physical-education-teaching innovation. Colleges and universities shall establish systematic and regular teacher-training systems to improve physical-education teachers' digital and intelligent-teaching proficiency comprehensively. First of all, update teachers' teaching concepts. Adopt thematic lectures, industry seminars and case demonstrations to help teachers fully understand the promoting effects of artificial intelligence on physical-education teaching, break rigid teaching mindsets, establish modern educational concepts of "data-oriented, precision-driven talent cultivation and intelligent education", and take the initiative to adapt to the development trend of intelligent teaching [14].

Secondly, carry out targeted special training focusing on smart-teaching-platform operation, sports-data interpretation, AI-device application, virtual-simulation-teaching-design and personalized-teaching-scheme formulation. Adopt hands-on training modes to provide systematic training for participants and improve teachers' capability to apply intelligent technologies. Build school-enterprise-cooperation and inter-school-exchange platforms, organize physical-education teachers to visit scientific-and-technological enterprises and high-quality colleges and universities to learn advanced intelligent-physical-education-teaching modes and practical achievements. Encourage physical-education teachers to participate in research projects on intelligent physical-education teaching and teaching-innovation competitions to accumulate practical experience in intelligent teaching [15].

4. Conclusion

The rapid development of artificial-intelligence technology brings new development opportunities for the reform and innovation of college physical-education teaching in the new era. It thoroughly transforms traditional rigid, one-sided and experience-driven physical-education-teaching modes, and drives college physical-education teaching to continuously upgrade toward personalization, precision-orientation, intelligence and scientification. At present, college physical-education teaching in China still faces problems including rigid teaching modes, backward content, and one-sided evaluation, which impair the improvement of physical-education educational quality. In the future, colleges and universities shall further promote the in-depth integration of artificial intelligence and physical-education teaching, continuously improve intelligent-teaching systems, keep exploring new modes and new approaches for physical-education teaching that fit talent-cultivation requirements and technological-development trends, remedy teaching weaknesses, give full play to the educational-empowering effects of intelligent technologies, boost the high-quality development of college physical-education, and provide powerful physical-education support for the implementation of the "Healthy China" strategy and all-round development of talents in the new era.

Disclosure statement

The authors declare no conflict of interest.

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