

Intelligent Physical Education: Utilizing Artificial Intelligence to Improve Learning Effectiveness

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Abstract: Intelligent physical education represents a novel pedagogical approach leveraging artificial intelligence advancements to enhance the learning journey in physical education. With the burgeoning interest in applying AI technology within sports-related domains, educational institutions have increasingly prioritized elevating the standards of physical education instruction. In this interaction, artificial intelligence has injected new vitality into school sports, but it has also brought a series of challenges and opportunities. Among them, potential risks that require special attention include imbalanced teacher status, student intelligence dependence, and alienation of teacher-student communication. In order to effectively address these challenges, we have proposed some development strategies: Firstly, it is necessary to enhance the intelligent information literacy of physical education teachers, so that they can flexibly use artificial intelligence technology for teaching; Secondly, students should strengthen their advanced deep learning abilities, cultivate their independent thinking and problem-solving abilities, rather than relying too much on intelligent technology; Finally, it is necessary to strengthen classroom emotional interaction between teachers and students, ensuring humanized care and communication during the teaching process. By conducting in-depth research on intelligent physical education, we can better understand how to use artificial intelligence technology to improve physical education, thereby enhancing students' learning experience and effectiveness.

Artificial intelligence (AI) emerges from a fusion of disciplines including computer science, control theory, information theory, systems science, and philosophy. It serves as a platform to replicate, enhance, and broaden human intelligence. Essentially, AI can be viewed as an offshoot of computer science, harnessing various other fields to emulate and amplify human cognitive abilities, which, with the rapid iteration and updating of computer technology, exhibits stronger intelligence and practicality, and is widely accepted by the general public. The swift advancement of artificial intelligence serves as a crucial pillar in propelling China's educational modernization forward. Bolstered by the nation's strategic planning and robust policies surrounding AI, the fusion of artificial intelligence with education is poised to deepen, fostering a symbiotic relationship. China's recent strides in integrating AI applications within the educational landscape have offered a fertile ground for innovation and enriched scenarios for the burgeoning AI industry. In 2018, the Ministry of Education unveiled the "Education Informatization 2.0 Action Plan," foreseeing the

transformative impact of rapid technological progress, notably AI and big data, on talent demands and educational paradigms. Embracing AI's trajectory into discipline-specific education aligns with the zeitgeist, promising substantial backing for the evolution of physical education within schools. Intelligent physical education is an innovative teaching method that combines artificial intelligence technology, aiming to improve the learning effectiveness and participation of students in physical education classes. With the continuous development of artificial intelligence technology, it has begun to show enormous potential in the field of education, bringing new possibilities to traditional teaching models. In physical education, intelligent physical education can not only provide personalized learning experiences, but also help students more effectively master sports skills and health knowledge through data analysis and real-time feedback ^[1]. The author will explore how intelligent physical education can utilize artificial intelligence technology, combined with teaching theory and practical experience, to enhance the learning effectiveness of students in physical education classes.

1. The Application of Artificial Intelligence in Sports

1.1 Application of Artificial Intelligence in Mass Sports

As artificial intelligence becomes increasingly intertwined with China's sports and fitness sector, a wave of intelligent fitness products is making its way into the consumer market. Wearable gadgets like smart wristbands and intelligent sports shoes are becoming commonplace accessories in people's daily fitness routines. The swift introduction and evolution of these smart products are hastening the seamless fusion of artificial intelligence with mass fitness activities, offering innovative solutions to enhance individuals' workout experiences.

1.2 Application of Artificial Intelligence in School Physical Education

Currently, the utilization of artificial intelligence in school sports is in its nascent stages of exploration. For instance, Beijing Sport University has introduced intelligent venues aimed at streamlining data management, enhancing operational efficiency, and elevating service quality. Meanwhile, Wuxi City has implemented an intelligent physical fitness testing system to impart students with cutting-edge fitness methodologies, including sports risk prediction and monitoring fitness outcomes. These tangible initiatives mark the initial steps towards harnessing AI's potential to bolster physical education in schools, laying the groundwork for further advancements in the field.

2. Potential risks of artificial intelligence improving the development of physical education

2.1 Risk of imbalanced teacher status

In the field of physical education, the group of physical education teachers is most significantly impacted by artificial intelligence. At present, the topic of whether the status of teachers can be replaced by artificial intelligence has become a hot topic of discussion in academia. Some scholars have proposed that artificial intelligence has redefined the way knowledge is disseminated. The creation or dissemination of knowledge is no longer limited to the single perspective of teachers, and teachers are no longer the only representative of knowledge authority. This seemingly one-sided view potentially reflects its rightful meaning. Although the immersive, data-driven, virtualized, and convenient features shaped by artificial intelligence enable physical education teachers to reduce their mechanized work in teaching and release teaching pressure. But from another perspective, the

work tasks originally exclusive to physical education teachers are gradually being replaced by artificial intelligence represented by ChatGPT, which seems to make the value of physical education teachers in school physical education optional. With the widespread application of artificial intelligence in the field of physical education, the degree of intelligence in physical education continues to improve. The virtualization, dataization, scientificization, and convenience of physical education teaching are more obvious. The imbalance of knowledge authority and the weakening of roles for traditional physical education teachers have become the trend. In terms of physical education, it is particularly important to timely examine the value of physical education teachers and consider how to enhance their unique "irreplaceability" while catering to artificial intelligence [2].

2.2 Risk of Student Intelligence Dependence

With the continuous application of artificial intelligence technology in physical education classrooms, students' learning experiences have become more diverse, playing an irreplaceable role in promoting their learning interest and teaching effectiveness. As early as 2014, a study demonstrated that compared to human teachers, students have better interactive learning effects with virtual teachers who mimic human emotional behavior. However, while artificial intelligence brings students a brand new learning experience, there are also potential risks related to the learning of student groups that are similar to those of physical education teachers. Firstly, artificial intelligence empowers students with "intelligence" dependence and eliminates their subjective initiative in learning. In traditional physical education classrooms, students encounter learning problems through personal communication and interaction with teachers and students to find causes and solve problems. Nowadays, with the help of artificial intelligence, students' autonomous exploration is gradually transforming into passive reception. For example, ChatGPT, which has powerful knowledge gathering and analysis capabilities, pushes learning resources and provides accurate answers through simple question and answer steps. Over time, this kind of "feeding style" pleasure inevitably washes out students' thinking ability and creativity in learning, especially after using it multiple times to complete learning tasks and achieve good grades, causing students to rely on technology in learning. Secondly, students may suffer damage to their knowledge construction under the "intelligence" dependence on artificial intelligence, losing their overall thinking due to a lack of systematic knowledge learning. In today's information age, artificial intelligence is integrated into all aspects of our lives. Students have long relied on intelligent search and recommendation, such as Tiktok News APP, Baidu, official account articles, ChatGPT, etc., which is mainly manifested in "seeing fast, seeing much, and seeing miscellaneous". Most information is just a temporary stay in the brain. Undoubtedly, fragmented learning embodies the essence of the digital age. However, this fragmented learning model can easily lead to the narrowing and rapid forgetting of knowledge content, and also break down the originally structured and logical knowledge system into incomplete parts. And physical education teaching is a holistic system, such as basketball dribbling, passing, shooting, and coordination of passes and cuts, as well as the arrangement of physical training cycles, which require students to have overall control [3-4].

2.3 Risk of alienation in teacher-student interactions

Education is a social practice activity aimed at cultivating human beings based on the social relationship between teachers and students. As artificial intelligence permeates physical education, its intelligent features bring about enhanced convenience and teaching efficacy, fostering an enjoyable learning environment for both teachers and students. Nonetheless, the integration of artificial intelligence also introduces nuances to the emotional dynamics within physical education

classrooms, potentially influencing the traditional teacher-student interaction paradigm. The widespread application of artificial intelligence in the education sector will make the dissemination of knowledge easier and the authoritative position of teachers will weaken, leading to the alienation of teaching into one-way knowledge transmission. However, in terms of knowledge acquisition, educator Dewey believed that "the purpose of learning knowledge is not the knowledge itself, but the ability to create knowledge to meet one's own needs." Obviously, the process of acquiring knowledge is more important than the outcome of knowledge acquisition. Teaching is a generative activity of subject interaction, and the charm of education lies in the teaching behavior and art that teachers emit during the teaching process. Under the influence of digital technology, the lack of interaction between teachers and students has gradually weakened the spiritual collision and emotional fusion that originally belonged to physical education classrooms^[5]. For example, AR, VR virtual systems, sports teaching data collection systems, mentor systems represented by ChatGPT, and football virtual teaching scenarios mentioned earlier, it is not difficult to find that although human-machine interaction can simulate the natural response of human emotions through simulation technology in sports teaching applications, it still belongs to the program code of data induction and statistics and the results of intelligent algorithm operation, without self-awareness, motivation and desire, making it impossible to achieve empathy and emotional feedback with individuals. It is precisely the data-driven and virtualized features created by artificial intelligence that to some extent dissolve the essence of interpersonal communication in physical education teaching activities. The original emotional experience and interaction have been simplified into programmatic and mechanical information symbols. The originally intelligent and warm teacher-student interaction has gradually become irrelevant in this process, which will inevitably lead to a decrease in individual empathy ability.

3. The Development Strategy of Artificial Intelligence in Improving the Development of Physical Education

3.1 Enhancing the Intelligent Information Literacy of Physical Education Teachers

The Ministry of Education's release of the Education Informatization 2.0 Action Plan (2018) underscores a strategic focus on elevating teachers' information literacy. Despite being at the forefront of integrating artificial intelligence into physical education, many physical education instructors possess only a limited grasp of AI concepts. This knowledge gap is particularly pronounced in regions with uneven distribution of educational resources, presenting considerable challenges in the effective implementation of AI technologies in practical teaching scenarios. Simultaneously, as artificial intelligence becomes increasingly prevalent in the realm of physical education, greater emphasis is placed on enhancing the intelligent proficiency of physical education instructors. In this context, physical education teachers need to re-examine their own value and, while possessing professional competence, should attach importance to improving their information literacy. Firstly, physical education teachers should establish a correct view on the use of technology. In the process of physical education teaching, the use of artificial intelligence technology should adhere to the principle of "use when possible, and control appropriately"^[6]. Secondly, in the digital age, physical education teachers need to strengthen their intelligent knowledge foundation. The use of digital technology by physical education teachers to enhance the depth and breadth of physical education is a mission entrusted to them in a new historical period. Thirdly, physical education teachers also need to have a high level of digital awareness. In some aspects, intelligent technology is more scientific, accurate, intuitive, and delicate than human teachers. However, at the same time, physical education teachers should be good at using intelligent technology in a reasonable manner and have a sense of discernment, distinguishing between truth and falsehood, and achieving precise

teaching. Fourthly, teachers need to enhance their awareness of lifelong learning, as the development of technology fills the future with uncertainty, and only through continuous learning can they keep up with the pace of the times. Therefore, physical education teachers should fully recognize that having a teacher's intelligent information literacy is not equivalent to mastering theoretical knowledge and technological applications. They should maintain a thirst for knowledge about technological applications and continuously strengthen their understanding and innovative application of technology in the process of physical education teaching practice. Fifthly, at the school level, support should also be provided for physical education teachers in the era of artificial intelligence. By optimizing the training system and assessment system of physical education teachers, the intelligent information literacy of physical education teachers can be improved. Specifically, the theoretical and practical content of artificial intelligence application should be included in the pre service and post service training plan of physical education teachers, as well as the corresponding artificial intelligence indicators should be included in the quality evaluation and professional title evaluation of pre service physical education teachers, in order to enhance the intelligent information literacy of physical education teachers in the information age.

3.2 Strengthening Students' Advanced Deep Learning Abilities

As stated in the 2022 Blue Book of Artificial Intelligence Education, intelligent technology is cleansing students of their basic abilities to independently identify, screen, and think. They are gradually becoming accustomed to the "intelligent feeding" learning method during the learning process and enjoying it. As a physical education worker, we should maintain sufficient vigilance on this issue. In an intelligent teaching environment, it is particularly important for teachers to actively strengthen students' higher-order deep learning abilities. Firstly, physical education needs to guide students to shift from shallow to deep learning. For example, in traditional physical education teaching, although body movements provide students with a more intuitive learning experience, they only stay at the shallow level of learning changes in movement strength, amplitude, speed, etc. Students have little knowledge of the mechanisms, principles, and cultural connotations contained in movements. In this era of digitalization, which embodies the symbols of the times, it is necessary to cultivate students' deep cognitive thinking and problem-solving abilities ^[7]. For example, in basketball learning, computer vision can be used to recognize and analyze the mastery of various basketball basic skills, running coordination, tactical application, and rule compliance of each student in the classroom, thereby guiding students to transform from surface level "technical action imitation" to deep level "overall movement analysis". Secondly, we also need to attach importance to cultivating students' higher-order thinking abilities. We must recognize that in the era of informatization, education has gained new connotations and significance. Education is no longer about cultivating individuals who acquire specific knowledge, but about strengthening the awakening of human subjectivity. It is about cultivating individuals with higher-order thinking abilities, such as creativity, imagination, teamwork, critical thinking, dialectical thinking, optimistic thinking, as well as a sense of responsibility, self-confidence, and enterprising spirit. In the selection of physical education teaching content, physical education teachers should establish student interests and learning needs ^[8].

3.3 Strengthen emotional interaction between teachers and students in the classroom

In the process of physical education teaching, the unique characteristics of artificial intelligence have gradually weakened the interaction and communication between teachers and students. For example, in traditional physical education teaching, teaching content such as explanation and demonstration, error correction guidance, and quality monitoring are increasingly being replaced or

even surpassed by artificial intelligence technology. However, in fact, the interactive relationship between teachers and students in physical education teaching is a dynamic structure that arises and continues to develop based on a person's unique emotional experience. Therefore, what can be replaced by artificial intelligence is actually only the specific content of teaching, such as explanation and demonstration, error correction guidance, and quality monitoring, while teachers cannot be replaced by machines in shaping students' emotions, emotions, and outlook on life. It is particularly important to highlight the emotional interaction between teachers and students in the context of artificial intelligence. Firstly, physical education teachers need to discern the essence of technology and return to the education oriented approach. In the past, education was often equated with knowledge transmission. As for artificial intelligence, its ability to impart fixed knowledge can be better than that of teachers. In this regard, future physical education teachers should fully recognize that the purpose of physical education is not limited to imparting knowledge and skills, but also to shaping students' personality, emotions, outlook on life, and worldview, promoting the development of students' physical and mental health and cultivating lifelong sports habits. Only by returning from a technological perspective to an educational perspective can individuals with free and comprehensive development be cultivated in intelligent education. Secondly, physical education teachers should shift their focus from emphasizing the completion of student tasks in the past to caring about the learning experience, insights, and the formation of sports quality that artificial intelligence cannot accomplish, based on the physical education learning environment and resources provided by artificial intelligence ^[9-10].

4. Conclusion

The advent of the artificial intelligence era has become inevitable. In the future, physical education in universities can only face challenges and seize opportunities to break through the shortcomings and limitations of traditional teaching models, and achieve innovative and even leapfrog development. It can be clarified that artificial intelligence will not completely replace the role of teachers, and its working methods and functions are greatly different from human intelligence. Therefore, artificial intelligence is an application tool in physical education, it is like a double-edged sword, and the key lies in using people. In the process of integrating college physical education with artificial intelligence, special attention should be paid to the factor of "people", that is, "educating people" should be the core of teaching, whether it is the manager in teaching, or the teacher or learner in teaching; Only by prioritizing "education" and implementing it emotionally, rather than just being superficial, can physical education in universities better embrace the era of artificial intelligence and win a place in future intelligent education.

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