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The Change and Development of Physical Education in The Era of Big Data

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Abstract: In the era of big data, physical education is facing unprecedented development opportunities and challenges. Data has become a valuable resource, providing a strong support for the reform and development of physical education. Big data technology has brought revolutionary changes to physical education teaching. Through the collection and analysis of students' movement data, teachers can more accurately assess students' physical condition and skill level, and then develop a more personalized and scientific teaching plan. This data-driven teaching model not only improves the efficiency of teaching, but also allows students to get more accurate guidance and support in learning. Based on this background, this paper deeply analyzes and discusses the role of big data technology in physical education and how to promote the reform and development of physical education in the era of big data. Of course, big data brings its own challenges. How to extract valuable information from massive data, how to protect personal privacy and data security, are all problems we need to face and solve. Therefore, while promoting the reform and development of physical education teaching, we also need to continue to learn and explore to adapt to this data-driven era.

Keywords: Big Data; Physical Education; Transformation and Development.

1. Introduction

The rapid development of information technology has also brought unprecedented opportunities for physical education. We are in the full advent of the information technology 2.0 era, big data, cloud computing, artificial intelligence and other cutting-edge technologies are gradually penetrating into various fields, physical education is naturally no exception. The application of big data technology enables physical education to more accurately grasp students' learning needs, sports performance and physical conditions, which provides the possibility for personalized teaching. At the same time, big data can also help teachers find problems and deficiencies in teaching, and provide strong support for teaching improvement.

However, in the face of the change and development needs of the new era, physical education is still facing many challenges. How to keep up with the pace of The Times, accelerate the development of information technology, and improve the quality and effect of physical education has become an important issue in front of us.

2. Role of Big Data in Physical Education

2.1. Promote PE Teachers to Innovate Teaching Mode and Content

With the continuous improvement of the Chinese government's attention to the reform of campus sports, a series of landmark policy documents have been issued, drawing a grand blueprint for the development of physical education. These documents not only clarify the direction and goal of physical education from the strategic level, but also provide specific guidance and support for the reform and innovation of physical education at the practical level.

In this context, the rise and application of big data technology has undoubtedly become a key force to promote the reform of physical education. With its powerful data analysis ability and accurate data mining technology, big data has brought unprecedented opportunities for physical education reform. Through in-depth analysis of students' sports data and sports habits, we can more accurately grasp students' physical condition, sports ability and potential needs, which provides a solid scientific basis for the innovation of sports teaching content and methods.

Students' desire for sports knowledge is growing day by day, they are no longer satisfied with simple physical exercise and skill learning, and the traditional sports teaching model has been difficult to meet their expectations. Students are eager to acquire more rich, interesting and practical knowledge and skills in PE class. Therefore, the innovation of physical education teaching mode is urgent. On the information-based teaching platform, sports knowledge can be presented in a more vivid and comprehensive way. By demonstrating the principle knowledge of muscle and nerve response and movement mechanism of human body in movement, students can more intuitively understand the scientific principle behind movement; By introducing the history, development and cultural connotation of various sports, students can gain a deeper understanding of the background and value of these sports. At the same time, the introduction of big data technology can collect and analyze students' movement data, and teachers can more accurately understand students' learning progress and difficulties, so as to adjust teaching content and methods in a targeted way. In addition, big data can also help teachers discover students' potential and strengths, and provide them with more personalized guidance and training.

The wide application of multimedia technology and teaching equipment has further enriched the teaching means and forms of physical education classroom. Live classroom allows students to participate in sports learning at home, breaking the limitation of time and space; Intelligent

equipment can monitor students' movement status and data in real time, providing more accurate data support for teaching; Sports APP can provide students with personalized learning plans and training suggestions to help them better improve their sports ability. These teaching tools not only enrich the teaching means, improve the teaching effect, but also greatly stimulate the enthusiasm and interest of students.

Especially in the context of online teaching in 2020, these Internet-based teaching tools play a vital role. Faced with the sudden challenge of the epidemic, PE teachers quickly adjusted their teaching strategies and used these teaching tools to provide students with a variety of online PE courses. These courses not only kept students in good physical condition during the pandemic, but also provided them with valuable learning opportunities and experiences. These successful practical experiences not only provide a strong guarantee for the special period of physical education, but also lay a solid foundation for the future reform and development of physical education.

The application of big data technology also breaks the limitations of traditional teaching. In traditional physical education teaching, it is often difficult for teachers to observe and analyze students' sports performance comprehensively. With the support of big data technology, teachers can accurately observe students' movement posture, force direction and other details through video playback, and give timely guidance and correction. This not only improves the pertinency and effectiveness of teaching, but also reduces the risk of injury to students due to wrong actions. At the same time, students can also use the teaching video for repeated practice and self-adjustment to improve their learning effect and satisfaction. This diversified teaching method not only improves students' learning interest and enthusiasm, but also improves the overall quality and level of physical education.

It is worth mentioning that big data has also brought a wealth of teaching resources and cases to the physical education industry. Through the shared knowledge base, teachers can easily obtain the successful experience of others, stimulate their own innovative thinking, and promote the continuous progress of physical education.

2.2. Improve the Training Effect

In today's era of big data, physical education is no longer a simple physical training, but a smart education integrated with scientific and technological elements. Among them, improving the training effect has undoubtedly become an indispensable part of physical education. The rise of big data technology has brought unprecedented changes to physical education.

In the past, physical education teachers can only rely on their own experience and feelings when making training plans, and it is difficult to ensure the accuracy and effectiveness of training plans. However, nowadays, through big data analysis, teachers can easily obtain students' movement data, such as speed, strength, skill, etc., so as to have a more comprehensive understanding of students' movement level. These data can not only help teachers find the advantages of students, but also deeply explore the shortcomings of students in training, and tailor suitable training programs for them.

In addition, big data analytics can help teachers monitor students' training progress in real time. By comparing the training data of students in different time periods, teachers can clearly see the progress and changes of students, so as to timely adjust the training strategy to ensure the best training effect. This kind of real-time feedback and adjustment greatly improves the training efficiency, and also makes the training more scientific and effective.

In addition to focusing on training results, big data technology also attaches great importance to the physical health of students. In the training process, teachers can analyze students' physiological data, such as heart rate, blood pressure, body temperature, etc., to timely detect changes in students' physical conditions and prevent the risk of sports injuries and overtraining. This preventive health management not only protects the students' physical health, but also lays a solid foundation for their long-term development.

3. Characteristics of Physical Education in the Era of Big Data

3.1. Break through the Time and Space Limitation of Traditional Physical Education

In the traditional mode of physical education, spacious venues are often needed. However, due to the school's own conditions, such as the size of venues and the perfection of facilities, the development of physical education courses is often subject to many restrictions. Not to mention, changes in the weather will also have a small impact on sports courses, rainy days, snow and other bad weather, may lead to physical education classes can not be carried out.

At the same time, students are under pressure to further their studies. Whether it is elementary school, middle school or high school, students need to face a variety of tests and pressure to enter school. In this context, the time of physical education is often compressed and cannot be fully valued and guaranteed.

However, with the advent of the era of big data, the application of Internet technology has brought new possibilities for physical education. With the help of network platform, physical education can break through the limitation of time and space and realize learning anytime and anywhere. Students can choose their own courses according to their own schedule.

In addition, the network platform also provides rich teaching resources for physical education. Many schools use the online platform to open a variety of forms of physical education activities, including traditional martial arts, folk songs and dances, modern popular sports, etc., so that students have more choices when choosing courses.

Under this teaching model, students can choose more freely the courses they are interested in and learn their favorite sports. At the same time, they can also learn about the course content and teaching methods in advance through the online platform, so as to make more informed choices.

More importantly, the Internet has also built a bridge for interactive communication between teachers and students. Students can interact and communicate with teachers through online channels, avoiding the embarrassment and tension of face-to-face communication. This way of communication not only makes students more willing to express their true ideas and opinions, but also provides strong support for the optimization and improvement of physical education teaching.

3.2. Student-oriented Teaching Mode

The student-oriented teaching model is undoubtedly a bright spot in the modern education system. The core idea of this model is to motivate students to spontaneously engage in

learning by stimulating their learning interest and intrinsic motivation. Especially in physical education, this teaching mode is particularly important. Because with the increasing burden of study, sports learning is often more difficult to arouse students' long-term interest and let them persist in it than traditional cultural courses.

In the traditional physical education teaching, we often see the teacher-led, students follow the teaching mode. Teachers lead students to exercise, but in many cases, the exercise mode is single and the exercise time is long, which is undoubtedly a huge challenge for some students with poor physical quality. It is difficult for them to keep up with the ever-increasing standards of physical fitness, and over time, they will develop resistance to physical education courses. This not only affects their physical learning effect, but also is not conducive to their physical and mental healthy growth.

However, in the context of the era of big data, we have more possibilities and means to improve this status quo. Big data technology can collect and analyze related data, so as to have a more objective, comprehensive and in-depth understanding of students' different needs for physical education. This understanding can not only help us better design physical education curriculum, but also provide a powerful reference for the implementation of personalized teaching work.

Under this teaching mode, students can choose courses independently from the information-based teaching platform according to their own learning needs and interests. Physical education teachers are no longer just imparting knowledge, but playing the role of guides and facilitators on the road of students' learning and development. This change of role not only gives full play to the students' subjective initiative and meets their individual needs, but also helps to cultivate their perseverance and persistence, so that they can harvest more growth and progress in sports.

Therefore, the application of student-oriented teaching mode in physical education undoubtedly opens a new door for us. It allows us to see more possibilities and potential of physical education, but also let us more firmly believe that only by truly respecting the main status of students, stimulate their learning interest and internal motivation, can they go further and more stable on the road of physical education.

4. The Reform of Physical Education in the Era of Big Data

4.1. Implementation of Personalized Teaching

The traditional physical education model has long been pursuing a "one-size-fits-all" teaching method. In this model, all students, regardless of their physical fitness, interests, or abilities, receive the same content and training for the same period of time. This kind of "big pot rice" teaching method is obviously difficult to truly meet the individual needs of each student, which makes the effect of physical education greatly reduced.

However, with the advent of the era of big data, physical education has ushered in unprecedented changes. Big data technology is like a key that opens the door to personalized teaching. Through the collection and analysis of students' performance, health status, interests and other multidimensional data in PE class, teachers can have a more comprehensive and in-depth understanding of students' individual differences and needs.

Based on these data, teachers can tailor a set of targeted and effective personalized teaching programs for each student. Instead of simply teaching a skill or movement, a personalized training plan is developed according to the characteristics and abilities of students to help them give full play to their strengths and overcome their shortcomings.

At the same time, big data technology can also help teachers monitor students' athletic performance and progress in real time. Through the analysis of students' sports data, teachers can find the problems and difficulties encountered by students in sports in time, and provide them with timely feedback and guidance. In this way, students can find the right direction in sports and improve their sports ability more efficiently.

More importantly, personalized teaching based on big data can also effectively prevent sports injuries. Teachers can customize appropriate training programs and loads for students according to their physical quality and athletic ability to avoid injuries caused by improper exercise.

In the process of implementing personalized teaching, the interaction between teachers and students has also been greatly improved. Students can view their own sports data and progress at any time through the digital platform, and take responsibility for their own learning. Through data analysis, teachers can grasp students' learning status and needs more accurately, adjust teaching strategies and methods in time, and make teaching more close to students' reality.

4.2. Reform of Sports Competition and Selection

In today's era of big data, the transformation of sports competition and selection is particularly striking. The traditional selection method is often limited to a single result and performance, although this way is simple and direct, but it is difficult to reflect the comprehensive quality of athletes. It often ignores the characteristics of athletes in psychology, physiology, skills and other aspects, and cannot provide enough reference information for the selection.

However, with the rapid development and wide application of big data technology, the way of sports selection has undergone earth-shaking changes. The application of big data technology makes the selection process more scientific, objective and comprehensive. By collecting and analyzing the multi-dimensional data of athletes in training and competition, such as training duration, training intensity, competition results, heart rate change, muscle strength, etc., the selectors can have a deeper understanding of the athletes' physical condition, technical characteristics and psychological quality. The comprehensive analysis of these data can help the selectors to more accurately evaluate the potential and development space of athletes, so as to make more scientific and reasonable selection decisions.

The application of big data technology has not only changed the way of sports selection, but also optimized the organization and management of sports competitions. Through the mining and analysis of historical competition data, event organizers can more accurately predict the results of the competition, formulate coping strategies in advance, and ensure the smooth progress of the competition. At the same time, according to the data characteristics of the athletes, the organizer can also arrange the schedule and group reasonably to ensure the fairness and enjoyment of the competition.

In addition, big data technology also plays an important role in the work of referees. Referees can use big data

technology to make more accurate judgments about controversial events in the game. Through the analysis of the movement, speed, strength and other data of the athletes in the game, the referee can evaluate the performance of the athletes more objectively and eliminate the influence of human factors on the result of the game.

In short, the application of big data technology has brought revolutionary changes to sports competition and selection. It makes the selection process more scientific, objective and comprehensive, and improves the fairness and enjoyment of the competition. In the future, with the continuous progress and improvement of big data technology, it is believed that sports competition and selection will usher in broader prospects for development.

5. Development and Reform Measures of Physical Education in the Era of Big Data

5.1. Simultaneous Upgrading of Physical Education Concepts and Facilities

The reform of physical education brought by network technology has undoubtedly injected new vitality into the concept of physical education. With the progress of The Times, physical education is no longer limited to the traditional classroom teaching, but gradually towards the digital, intelligent new era. In this context, schools should not only upgrade the teaching concept, but also keep up with the pace of The Times in hardware facilities.

In order to meet the diverse needs of society for physical education, schools must provide comprehensive and advanced sports facilities for students and teachers. However, in reality, many schools feel inadequate in the construction of sports facilities, so actively introducing social or government resources has become a viable option. In this way, schools can not only have complete sports facilities, but also use these facilities as social resources to open to the public, which can meet the needs of students' sports and meet the needs of society.

At the same time, PE teachers also shoulder an important mission. They need to actively apply for funding, develop rich and diverse physical education programs, and make full use of available resources, especially online resources. In the case of teacher shortage, teachers can be shared with other universities and cloud courses can be set up to provide students with more diversified learning options. In the case of making full use of the advantages of big data technology, to provide personalized teaching and training programs for students. Through the collection and analysis of student learning data and health status, teachers can more accurately understand the needs and characteristics of each student, and thus more in line with their own development.

In addition, teachers also need to continue to learn, improve the ability of information teaching, deepen the understanding of the development of sports information, so as to further improve the quality of physical education and contribute to the growth of students and the development of society.

At the same time, teachers can guide students to explore their own areas of excellence according to their interests and specialties, and cultivate students' innovation ability. For example, for some students who are talented in basketball, teachers can provide them with more basketball training and competition opportunities to help them tap their potential and maximize their personal value.

In the era of big data, the development and reform measures of physical education provide students with a broader space for development and a richer learning experience. Through interdisciplinary teaching, active participation in sports competitions, and the use of big data technology, we can better cultivate students' all-round development and innovation ability, laying a solid foundation for future growth.

5.2. Make Use of Students' Information Literacy

A new generation of students, who thrive on the tide of the Internet, have been closely associated with and deeply influenced by information technology since childhood. Facing these students with high information literacy, educators should make good use of this advantage and transform it into a powerful tool to improve the effect of physical education.

Nowadays, for students, sports apps, sports bracelets, PSP sports games, Xbox sports games, etc. are no longer new things. These modern sports technology products not only provide students with a variety of sports, but also let them experience the fun and benefits of sports in the game. Therefore, qualified PE teachers should take the initiative to understand and be familiar with these popular sports games, skillfully integrate them into daily teaching, and guide students to feel the charm of sports in a relaxed and pleasant atmosphere.

In the teaching process, teachers should take a highly responsible attitude, actively innovate teaching methods, and let students immerse in the ocean of information sports learning. By using VR technology, students can personally experience sports that are difficult to achieve in reality, such as skydiving, and this immersive feeling will undoubtedly greatly stimulate students' enthusiasm for learning. In addition, teachers can also use the sports APP to encourage students to actively participate in sports and cultivate their exercise habits.

In short, the flexible application of information technology in physical education can not only improve the teaching effect, but also stimulate students' learning interest and enthusiasm, so that they can enjoy the fun of physical education learning in the wave of information.

5.3. Information Transmission

In the era of big data, the transmission of information has become more and more rapid and extensive, and this phenomenon is particularly significant in the field of education. As an important part of education, physical education also makes full use of the advantages of the Internet to realize the effective transmission of educational knowledge.

In this information age, teachers are no longer the only source of knowledge. They can consciously learn the latest physical education knowledge on various information platforms, and constantly update their educational concepts and teaching methods to better adapt to the needs of The Times. These new knowledge not only enrich the connotation of teachers' education, but also provide strong support for their teaching practice.

At the same time, students also benefit a lot from this information education environment. They can easily obtain all kinds of useful knowledge through the education platform, which can not only satisfy their learning interests, but also lay

a solid foundation for future social practice. The behavior of students consciously sharing and transferring knowledge further promotes the circulation and sharing of educational information and forms a virtuous educational cycle.

However, in the face of massive educational information in the era of big data, teachers also need to keep a clear head. They need to carefully select the information that is really beneficial to physical education and avoid being disturbed by useless information. At the same time, they should always bear in mind that information technology is only a tool to serve the cause of physical education, and its ultimate goal is to complete the goal of education serving society.

Therefore, when making network teaching plan, teachers need to fully understand the actual situation of students, including their physical literacy and learning willingness. Only in this way can we ensure that the teaching plan meets the needs of students' learning and development, and provide a strong help for the smooth realization of the goal of physical education.

6. Conclusion

In the context of the era of big data, physical education teaching is ushering in unprecedented opportunities. We should grasp the pulse of this era and make full use of Internet technology to optimize physical education teaching. Students are living in the information society and already have a high information literacy, which provides rich resources and means for physical education. Through the application of Internet technology, we can present a wealth of sports teaching information to students, stimulate their enthusiasm for sports learning, and then improve their sports literacy.

At the same time, teachers also need to constantly update and optimize their own concept of education, and actively explore the information teaching model suitable for students. We should make full use of the advantages of Internet technology and combine it closely with physical education, so that technology can better serve the teaching work. This can not only improve the effect of physical education, but also protect the healthy and comprehensive development of students. Let us work together to meet the new challenges and opportunities brought by the era of big data to physical education, and contribute wisdom and strength to the healthy growth of students.

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