Application of Big Data in Comprehensive Management and Service of Sports Training System Under the Background of Informatization

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Abstract. With the development of computer technology and network technology, we have taken the step of information construction. In just a few years, we have carried out systematic preparations for information technology, such as preparing to build a fully automated office system and educational administration management system. However, there are still major defects in physical education and teaching. There is no operable software at all. Physical education teachers are facing a huge workload during the annual physical education test period. Therefore, this paper combs and analyzes the big data precipitated in the process of sports comprehensive management and service, and finds that the rational use of big data resources makes sports management decisions more scientific and effective, and sports services more reasonable and humanized, so as to realize the transformation and upgrading of sports education management and service work.

Keywords: Physical training · Promotion of information technology · Big data · Integrated management and services

1 Introduction

With the development and application of computer network technology and the prevalence of modern high-tech education supporting facilities, a variety of network information management system software have been widely used in Colleges and universities. According to the disadvantages of physical education in Colleges and universities, build the corresponding data information system, and make full use of high-tech data mining technology, To achieve fully automated processing and a huge sports data information analysis system, so that students can query their grades more easily, and teachers can analyze and count the data more conveniently. The advantage of this system equipment is not only that it can efficiently, accurately and accurately find all kinds of results, but also classify and summarize the results ranking and screening work. The most important thing is that it can formulate different training plans according to students with different physical qualities, track and evaluate students' health status at any time. In this way,

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Students can know their physical condition like the back of their hand, improve their love for sports, and really integrate cultural education and physical education.

Nowadays, many colleges and universities have begun to explore and study the system software one after another [1]. Data mining technology is used in the current teaching and education management system, and students' physical fitness is obviously enhanced, which greatly improves the teaching management level of the school. Here, the author boldly puts forward the scheme of student sports performance assessment management system based on the current problems in Colleges and universities. The purpose is to use the system to solve various problems faced by colleges and universities in physical education, so as to help students have enthusiasm for physical exercise and make students have excellent physique, So as to ensure the teaching quality and teaching effect of the school.

Sports training system refers to a comprehensive examination and observation of the body of people engaged in sports training through medical and biological means, to evaluate their level and state, and to provide basis for scientific training. It is an important means to ensure the normal training and achieve good results. In order to improve the competitive level of athletes, athletes should undertake high-intensity and high-volume training, which requires the use of medical and biological means and technologies to monitor athletes. Timely understand the changes of athletes' physical functions and their adaptation to training. Only in this way can we ensure that athletes can give full play to their potential without causing sports diseases and affecting training. It includes the following aspects:

1. Athlete self supervision

Mainly through the athletes' self-monitoring table, the athletes themselves record the changes of some physical indicators, timely find some of their own problems, and remind the coaches to pay attention.

2. Physical examination

Including the examination and evaluation of athletes' body shape and function. Establish the basis of athlete evaluation model.

3. Diagnosis of sports diseases

Mainly for the diagnosis, first aid, treatment and rehabilitation of some diseases caused by exercise.

4. Supervision of athletes' physical function

This is an important component of medical supervision. An accurate evaluation of athletes can help coaches accurately understand the situation of athletes and reasonably arrange training. At the same time, athletes should know their own situation and adjust in time to ensure a good level of function.

5. Reasonable fatigue elimination measures

Eliminating exercise-induced fatigue is an important component of medical supervision. Ensure that the athletes are in good physical and functional condition, and ensure the athletes' training level.

6. Reasonable nutrition measures

Reasonable nutrition measures can ensure and improve the athletes' functional level.

2 Research Status at Home and Abroad

The concept of big data was first proposed by Mai Qingxi, a world-famous consulting company. It generally refers to the massive data generated in the era of information explosion. Through the processing and analysis of these massive data, we can filter or mine some valuable information. This information can effectively analyze the causes of problems, improve work efficiency, improve scientific decision-making, correctly predict the future, understand the laws of things, and provide the direction of solution and decision-making basis. By searching academic resource websites, relative to the research and Discussion on the application of big data in the fields of Ideological and political education and library management, the relevant research in College Physical Education and teaching mainly focuses on three aspects. First, the era of big data will have multiple effects on physical education and teaching. Zhang Hui's research shows that big data has the characteristics of large volume, complexity and value, which makes people reach an unprecedented height in the analysis, understanding and application of data, and all industries and fields are facing great impacts and challenges. Through the analysis of the concept of big data, this paper reveals its impact on college physical education teachers, college students and college physical education teaching, and analyzes and considers the preparations that the physical education industry should make when facing the huge value released by massive data. Second, big data is applied to the comprehensive reform of physical education, especially the management of physical education and teaching. For example, Zhou Xi and Liu Huijing made a countermeasure analysis in the research on comprehensive reform of School Physical Education - from the perspective of big data and innovation of physical education in Colleges and universities. Zhang Wenhua's research analyzed the impact of big data on "teaching" and "learning" of physical education from the perspective of information, Find the challenges and development prospects in physical education. Third, the theoretical discussion of big data in physical education teaching [2]. For example, Liu officials and Liu Huaijin put forward in the article that through the analysis and processing of the data in physical education teaching, we can find the value that can be used, reveal the essence behind its teaching phenomenon and explore the law of physical education teaching, the training system is shown in Fig. 1.

From the analysis of existing literature, the research on big data in physical education management and service is still relatively weak. On the one hand, most of the existing research focuses on the theoretical level and possibility, and lacks specific research on the process and practice of big data in physical education management and service; On the other hand, there is little empirical research on College Physical Education under the condition of big data environment in the previous research, which can not deeply mine, systematically integrate and locate the big data resources precipitated in physical education teaching. Moreover, although some studies have systematically analyzed the application of big data in physical education, there are still great limitations. They have not been deeply into the system to reveal the relationship between physical education teaching, physical supervision, extracurricular exercise, the second classroom, sports training of high-level sports teams and other factors. The research on the application of big data in college physical education is still blank. With the wide popularization and in-depth application of big data concepts and technologies, and with the rapid promotion of physical education reform, there will be more and better research on big data in

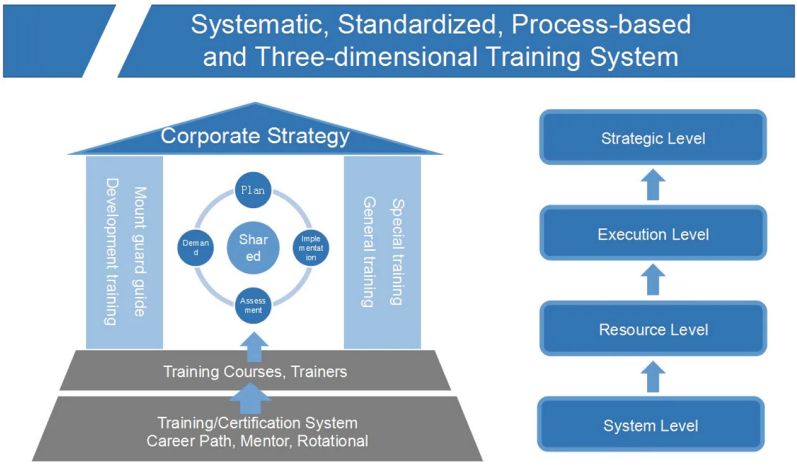

Fig. 1. Systematic training system

the field of physical education in Colleges and universities. Because practice does not stop, there will be new development in theory, and big data will penetrate all aspects of physical education in the future. Therefore, Exploring the specific application of big data in college physical education management and service has become an important topic.

3 Data Flow Analysis of Sports Training System

Because data is mobile in the process of operation and processing, data flow analysis is to analyze these flowing data. On the whole, the content to be analyzed is all data information.

In order to successfully complete the data analysis, there are two contents that need special attention: (1) data flow direction. It is the first condition to solve some data problems; (2) What changes have been made in the data flow process, and write down these changes in time. The purpose of data flow analysis is to find out the difficulties and vulnerabilities in data flow, such as flow interruption, numerical difference, etc. these difficulties and vulnerabilities should be clearly exposed during analysis and handled one by one.

The biomaster job analysis evaluation and exercise training system is the first integrated job in China. It is a comprehensive rehabilitation function diagnosis and treatment equipment integrating virtual reality, interactive training and rehabilitation evaluation. Through advanced wireless human body sensor technology and virtual reality technology, biomaster can record human joint activity and three-dimensional kinematic parameters in real time, and formulate personalized situational interactive training programs for patients, so as to improve patients' limb motor function and cognitive level. It is a comprehensive rehabilitation evaluation and sports training equipment. The biomaster hardware is mainly composed of advanced wireless human body sensing equipment.

Through the rehabilitation evaluation and training of different joints or trunk, it can collect spatial three-dimensional kinematic information in real time to accurately reflect the kinematic characteristics of the patient's joints or spine. Biomaster software: the biomaster software includes three modules: virtual reality, interactive training and rehabilitation evaluation. Through the collection of three-dimensional kinematic data, accurately evaluate the patient's joint activity, and carry out targeted personalized situational interactive training through the biofeedback technology of visual or auditory signals.

After analyzing the data flow, record the analysis results, and visually display the data flow direction through the data flow diagram. Developers develop corresponding software based on the flow information of these data. Three layer flow diagram is the most common data flow diagram description method. It can intuitively present the whole situation of data flow to developers [3]. The three-layer flow diagram has top, zero and one layer. The top level is for the flow of the entire data. Focus on the performance of edge data information: the zero layer is the refinement of the top layer, which describes the flow of data in the operation of functional modules in detail: the first layer, as the final functional module, is the smallest unit that can be realized. Figure 1 is the top-level data flow diagram of the system.

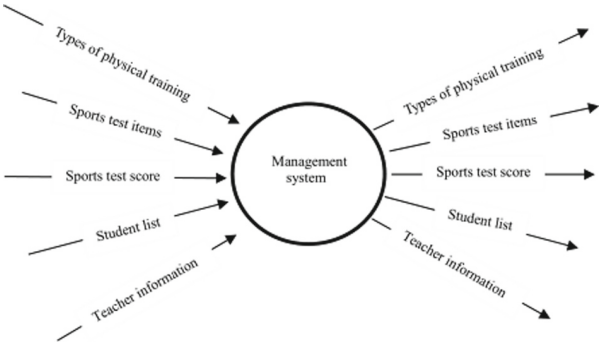

Fig. 2. Event level data flow chart of sports team performance Puli

4 Research on the Application of Big Data in Sports Comprehensive Management and Service

All links of sports management and service work can constitute the basic elements of big data. It is necessary to form a system and mechanism to ensure the collection, sorting and analysis of various data and their authenticity and integrity, accept big data thinking with a positive attitude, establish a public platform and operation mechanism for big data of sports management and service, and realize data sharing inside and outside the school, Barrier free experience the changes brought by big data, formulate the long-term plan of big data education application, and realize the transformation and upgrading of physical education management and service. Promote the deep integration of modern information technology and education and teaching, and accelerate the reform of education and teaching.

4.1 Practical Research on Big Data in Physical Education Management

Big data makes the physical education management process digital and intelligent, realizes the real-time mobile management of teachers' teaching and students' learning, and improves the authenticity and effectiveness of teaching evaluation and the effective value of feedback application; When big data is applied to venue management, it can collect real-time data on the use of venues and students' extracurricular activities, so as to scientifically set the allocation, use and construction management of venue resources. In order to achieve integration, cross-border, foundation and breakthrough of big data in sports comprehensive management and service, we need to make full use of the existing education information technology and realize the leapfrog deployment of technical resources related to big data application through advanced cloud computing and virtualization technology.

$$\begin{aligned} Vis(p) &= 1 - \frac{1}{1+e^{(\mathrm{Con}-\mathrm{Con}(p)/k_2)}} \\ Dis(p) &= \frac{1}{1+e^{(\overline{S}-S(p)/k_1)}}, \end{aligned} \tag{1}$$

4.2 Research on the Application of Big Data in Physical Education

The role of "big data" in physical education teaching requires the final reform and optimization of physical education teaching and sports skill learning through the procedures of data collection, data screening, data analysis and data display. The integrity and accuracy of data collection determine the "big data" The effect of application, including the basic information, learning information, behavior information, social information and sports skill information of education stakeholders, that is, the internal and external environment of sports learning, constitutes the big data of physical education The real-time data and prediction judgment of technology can be adjusted and optimized in sports item selection, curriculum arrangement, teaching methods, teaching means and teaching evaluation, and gradually develop the traditional, empirical and collective teaching to a more scientific, visual and personalized education. "Big data" Applied physical education teaching is through the record of physical education learning process and track, through learning analysis (that is, it mainly involves the research and application of learning analysis, behavior analysis and prediction analysis), establish a learning model to judge students' sports learning effect and sports behavior trend. The application of big data technology can convert physical characteristics, learning materials, practice times, action standards, learning methods and learning effects into data. Students can correctly understand the action standards, adjust the practice frequency, understand their own advantages and disadvantages in sports skill learning, and change them in time Correct and wrong actions to realize students' self-directed learning [4]. The digitization of the whole teaching process enables teachers to fully understand students, provide personalized sports skill training programs for students with different physical and personality characteristics according to their learning data, better achieve the combination of collective guidance and individual guidance, enhance students' interest in learning, and then turn sports interest into sports Habit, make personalized physical education possible and lay the foundation for lifelong physical education.

The application of big data in physical education classroom is separated from the classroom, and learning resources become richer and easier to obtain. The online and offline open teaching mode makes the physical education classroom more a place for summary, communication and display, and bid farewell to the era of only one physical education class per week. By comprehensively and accurately mastering and analyzing the current situation of students' physical quality, analyze students' interest and love in sports Good and strong points, develop courses, teaching methods and training methods aimed at students' physical quality and characteristics, implement teaching according to their aptitude and comprehensively promote students' physical health; enrich and expand physical education teaching mode, change physical education teaching design, change students' learning methods through teaching design, meet students' personalized learning needs, and effectively promote teaching and learners' knowledge competition To improve the effective teaching and learning of physical education.

4.3 Practical Research on the Promotion of Students' Physical Health by Big Data

Through the collection of physical fitness test data organized by the Ministry of education every year, the conversion and storage of data are realized according to the reasoning rules, and the database is established, which can accurately analyze the current situation of students' physical fitness to improve the pertinence and effectiveness of education. Big data records the changes of students' movement trajectory and physical fitness, solves the problem of collecting students' physical fitness data every year, and can calculate the number of movements in real time According to and physical data, through analysis, it provides students with Sports Prescriptions of different gender, age and sports habits, provides students with real-time data comparison, improves the effect of sports prescriptions, improves students' Sports confidence, and helps teachers to comprehensively guide and evaluate students' sports skills and physical quality.

4.4 Research on the Application of Big Data in Competitive Sports of School Sports Teams

Through the big data of sports world campus app running, wechat sports, keep and other sports software in students' extracurricular exercise, we can understand students' exercise time, exercise frequency, exercise content and other information, so as to provide more scientific exercise methods, means and forms, and improve students' enthusiasm to participate in physical exercise. Through data analysis, activity project development can effectively guide students Extracurricular physical exercise, scientifically guiding students to exercise, plays a role in improving students' Sports literacy, effectively improving students' Participation Effect in physical exercise and enhancing their physique Figs. 2 and 3.

$$\mathrm{Coe}(p) = \mathrm{Dis}(p) \cdot \mathrm{Vis}(p).$$

Rely on big data technology to realize the material selection, training means, technical analysis, running track, state diagnosis and pre competition information collection

Fig. 3. The traning programs system in the paper

in the field of competitive sports of college sports teams, so as to scientifically guide students in training; coaches give targeted guidance to athletes' technology and scientifically train athletes' professional quality; analyze athletes' competitive state through training big data To predict the competitive state of athletes in a certain period, so as to provide a scientific basis for coaches to formulate training plans. The test indicators are shown in Fig. 4.

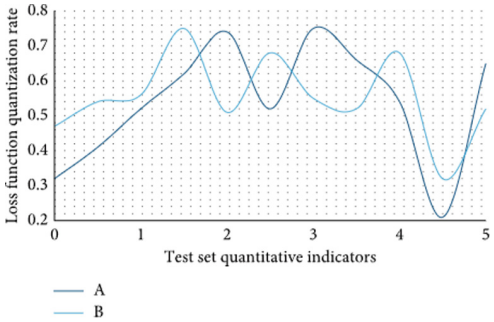

Fig. 4. Test set indicators

5 Conclusion

China attaches great importance to the construction of statistical informatization. The construction of statistical informatization has been carried out since the 1980s. From the earliest computer application, through the application of statistical information system

and the application of Internet technology. From the simplest stand-alone data processing system to the current online reporting comprehensive data processing platform, statistical informatization technology has developed rapidly and has been developed so far It is beginning to take shape. We should reasonably mine, systematically integrate and locate a large number of data resources precipitated in the process of sports comprehensive management and service, make rational use of the methods and means of big data processing and analysis, and make full use of the accurate and timely information provided by big data, so as to make sports management decisions more scientific and effective, make sports services more reasonable and more human, so as to realize sports education management And service transformation and upgrading.

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