Application of Big Data Technology in Smart Sports Teaching

Summary

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Abstract. With the advent of the era of big data, the huge amount of complex and diverse data is displayed in front of people. What is changing is people's living conditions and demand levels. What is worth noting is the influence of big data thinking on people's view of things. With the rapid development of data and information in the era of big data, physical education educators in Colleges and universities attach importance to the value of data and have the corresponding ability of data processing. The thinking of educational objects is active and the pursuit of individuality makes the environment of physical education in Colleges and universities more complex. Based on the big data era, based on the intelligent sports test platform, this paper conducts a questionnaire survey on college students and teachers. Through the investigation and analysis, it can be seen that at present, college teachers' innovative cultivation of students' physical education teaching is significantly insufficient, and less than 5% of teachers pay attention to this aspect. Most students choose more than 60% of college physical education courses for credit exam oriented learning, which needs to be done promote.

Keywords: Big Data Era; Physical Education; Smart Sports; Test Platform

1. Introduction
At present, the new generation of information technology, represented by the Internet, big data and artificial intelligence, is booming, which has a significant and far-reaching impact on the economic development, social progress and people's life of all countries. The United Nations released a white paper on big data, announcing that the era of big data has come. China is closely following the development trend of the times. The arrival of big data era has brought new impetus to the innovation and development of China's economy, promoting the continuous progress of China's education, and creating more conditions conducive to the development of all aspects of society. Therefore, the carrier innovation of physical education in Colleges and universities should firmly grasp the era of big data and promote the carrier innovation to obtain satisfactory results.

The country's requirements for talents are more and more comprehensive. Excellent talents must have strong physique, otherwise it is difficult to support future work and China's development. Since the founding of the people's Republic of China, the state has been very concerned about the physical quality of the youth of all ages, and actively encouraged and promoted the youth to participate in physical exercise. However, according to the physical health test data of college students for many
years, the physical quality of young college students has not been really improved. Although the economy of the country has begun to take off and people's living standard has been improved since the reform and opening up, the physical development and nutrition level of the youth have been improved, but also the obesity rate and the incidence rate of young hypertension in young college students have increased [2]. And because of the lack of exercise, bad living habits and heavy learning pressure, the physical quality of young college students has been in a downward trend for many years. Although the causes of this phenomenon may be various, it must be admitted that college sports work has a considerable part of responsibility. University is the last stop for students to take part in the work from school to society. The physical education workers in Colleges and universities should pay attention to it, take improving the health level of young college students as the goal, actively guide the young students to actively participate in physical exercise, teach sports knowledge and skills and scientific exercise methods. Only by improving the key content of physical education in Colleges and universities can the physical quality of young college students be enhanced, and then lay the foundation of human resources for national development and national rejuvenation. Because the function module of the current college students' physical health test data platform is still in a relatively single stage, at the same time, the research at home and abroad mainly focuses on how to realize the National Students' physical health test data platform, software or the specific server framework of related systems, client design and data security from the technical means and computer language programming. However, there are not many research results in the selection of relevant functional modules and the analysis of the importance degree. The degree of research is not deep enough, and the research angle is relatively single [3].

Based on the actual needs of college students for physical health test data management and the school's demand for students' health intervention, this paper studies the function modules and function realization that the university students' physical health data platform should have, so as to achieve the results of smart sports and obtain the innovation of research perspective.

2. The Application of Big Data Technology in Smart Physical Education Teaching Summary

2.1. Big Data and Its Characteristics

We all have personal experience of the changes and impacts brought about by the era of big data, but when it comes to what is the era of big data, we may be at the level of vague cognition and general understanding. To explore the carrier innovation of Ideological and political education in Colleges and universities in the era of big data, we must first uncover the mystery of the era of big data and understand the basic concepts, and then grasp the characteristics of the era of big data. This is the necessary prerequisite for the research on the carrier innovation of ideological and political education in Colleges and universities in the era of big data.

1) Origin of Big data

The biggest change in the era of big data is the significant growth of data volume. With the improvement of informatization in all walks of life, all kinds of business data are exploding in the form of geometric progression. Some information can be found in the relational database, some data exist in the form of e-mail, word processing files and a large number of information stored and published on the Internet, as well as information found in rich video, image and sound files. In the face of diverse forms and complex content of data, it is no longer possible to analyze and process it in the past way. Advanced analysis tools are needed to create or use a structure that is easier for people to perceive and interact with, so the concept of big data emerges as the times require. Generally speaking, big data is not a simple single data, but a data set with its own characteristics; it can also be regarded as an advanced technology that can collect, sort out and analyze complex data; the ultimate value of big data lies in the use of new technologies to obtain useful information from massive data, analyze and predict the future, and solve existing problems in a timely manner.

2) Big data features

Each era has its own characteristics, which are different from other times. The big data era also
shows its unique characteristics. Complex, diverse and large amounts of information show the obvious advantages of the era of big data. Only relying on the huge amount of data can not comprehensively summarize the uniqueness of the big data era. Therefore, a complete grasp of the characteristics of the big data era has a positive effect on the comprehensive understanding of the big data era and the writing of the follow-up content.

In the era of big data, with the help of the advantages of big data, it is developing continuously. Mel Schoenberg summed up the characteristics of big data era into three points: more, more chaotic and relevant. In the era of big data, we tend to study all data. In the case of limited data analysis technology, people use a small amount of data to obtain more information, but only a small amount of data analysis can not obtain some micro details of information. When we are faced with massive data and are no longer limited by the information processing capacity, it is meaningless to only analyze the sample data. In the era of big data, we pay more attention to the comprehensiveness of data and enrich comprehensive data resources, which lays the foundation for reasonable analysis of data and discovery of more valuable information. It also refers to the pursuit of data hybridity in the era of big data. In the period of insufficient information, each data information affects the results of data analysis. Therefore, only ensuring the accuracy of each data can ensure the correctness of the analysis results. Therefore, we can see that accuracy is the product of the era of lack of information. In the new era of data and network, we should correctly understand the advantages and disadvantages of accuracy. In the era of big data, all available data can be effectively used. When the amount of data obtained increases gradually, the requirement for data accuracy is not so high. Accurate results can also be obtained by analyzing a large number of data. Relevance refers to the change from focusing on causality to focusing on correlation, which is a fundamental change brought about by big data. In the past, people only pay attention to causality, but with a large amount of data, we will observe many spurious correlation, and with more advanced data processing tools, it is more conducive to find the correlation. Therefore, in the era of big data, it is not necessary to grasp the causality behind the data, but to grasp the correlation between data.

2.2. Current Situation of University Physical Fitness Test Data Platform
Eighteen years have passed since the national student physical health standard was put into trial use in 2002. With the continuous update and progress of computer Internet and other technologies, the collection and management system of physical health test data serving schools is also in progress. The software development of physical health test data reporting over the years is shown in the table below [5]. According to the table below, it can be seen that from 2002 to 2004, the physical health test data reporting software is a paid software developed by Beijing Jiete century economic and trade company. It is called the student physical health standard intelligent service system. It has the functions of collecting, scoring, statistical analysis, querying, score management, score management, etc. Physical health diagnosis and exercise prescription, data reporting and other functional modules. However, due to the need to charge for the use of this version of the system, there are also some reasons, such as imperfect software function, complex operation process, technology monopoly by Beijing Jiete century economic and trade company, which makes students and teachers have poor experience in using the software. From 2005 to 2007, the Ministry of education of the people's Republic of China has uniformly stipulated the use of data reporting tools to report physical test data, which are divided into primary school, secondary school and university. According to whether intelligent testing instruments are used to collect data, they are divided into intelligent version and manual version [6]. Today, the Internet technology is becoming more and more advanced, and big data is increasingly covering all aspects of our lives. However, the function of the reporting software is still not much improved, and even sports prescription and other functions are deleted. At present, the six schools in Changchun City are using this software for reporting physical health test data, or can only achieve scoring, reporting and other simple functions, with poor practicability. There is no separate platform software for the analysis and utilization of physical test data [7].
2.3. Basic Algorithm of Big Data:

(1) Mean square error

\[ \text{RMSE} = \sqrt{\frac{\sum_{(u,i) \in T} (r_{ui} - r'_{ui})^2}{|T|}} \]  

(2) Mean absolute error

\[ \text{MAE} = \frac{\sum_{(u,i) \in T} |r_{ui} - r'_{ui}|}{|T|} \]  

(3) Accuracy

\[ \text{Precision} = \frac{\sum_{u \in U} |R(u) \cap T(u)|}{\sum_{u \in U} |R(u)|} \]

3. The Application Design Analysis of Big Data Technology in Smart Physical Education

Teaching Summary

3.1. Technical Feasibility

From the technical point of view, the physical health test data platform in the technical level can be realized and run well. The paper "the design and implementation of the physical health data management system based on lousliaig5 platform" points out that lousliaig5 framework, as a simple, practical and easy to develop computer platform, has the characteristics of wide popularization and applicability. Based on lousliaig5 platform, the corresponding physical health data management system is designed and developed, which realizes the maintenance and change of students' basic information, school sports venues and facilities query, physical health test introduction and historical data query, report physical test data and other functions. The paper "design and implementation of the physique detection system based on Kinect" points out that Kinect is a kind of 3D sensor, which has the functions of real-time dynamic image capture and image recognition, and can be used to collect a variety of data. Based on Kinect, the paper designs a physique detection system, which realizes the students' physical test data detection of distance module, visual tracking module and medical examination module. In the paper "cloud based national physical fitness data management", python language is selected as the development language of cloud platform, and Django framework is selected as the development framework of cloud platform. Finally, it tests the login module, physical health test module, start exercise prescription function module, fitness scheme management module, personalized exercise prescription generation query module and equipment statistics module Cloud platform for national physical fitness data management. At the same time, Jilin University itself has rich network resources and hardware resources support, and has a relatively strong talent reserve. Relying on the existing computer laboratory and campus network, it can provide technical feasibility for the construction of university students' physical health test data platform [8-10].

3.2. Design Principles

The design principles of College Students' physical health test data platform are as follows: (1) the principle of comprehensive integrity; (2) the principle of convenience and easy to use; (3) the principle of safety and reliability; (4) the principle of openness.

4. Analysis of the Application Results of Big Data Technology in Smart Physical Education

Teaching Summary
4.1. Investigation on the Reasons for Course Selection

As can be seen from Figure 1, 56% of the students chose the public physical education course because of the simple course assessment and easy to obtain credits, 27% of the students chose the corresponding sports public class because of their interests and hobbies, 13% of the students were required to choose the physical education public course required by the school, and finally 4% of the students chose the public physical education class together. Basically no students choose the corresponding physical education public class because they want to improve their physical fitness and function. Therefore, it is necessary to design the recommended physical education public course option based on the students' physical health monitoring data, feed back the option to the students or directly integrate it into the course selection interface of the educational administration system, and then the students can comprehensively consider their own schedule arrangement and interests to choose their own physical education public courses.

4.2. Evaluation System

| Evaluation content                        | Number of Teachers | Proportion | Number of students | Proportion |
|-------------------------------------------|--------------------|------------|--------------------|------------|
| Teachers' teaching attitude              | 14                 | 46.67%     | 442                | 88.4%      |
| Teachers' teaching methods               | 13                 | 43.33%     | 394                | 78.8%      |
| Teaching effect of Teachers              | 13                 | 43.33%     | 278                | 55.6%      |
| Teachers' sports skills                  | 7                  | 23.33%     | 351                | 70.2%      |
| Teachers' ability of work innovation     | 10                 | 33.33%     | 185                | 37%        |
| Teachers' scientific research ability    | 9                  | 30%        | 36                 | 7.2%       |
| The moral level of Teachers              | 13                 | 43.33%     | 191                | 38.2%      |

From table 1, the content of PE Teachers' teaching evaluation mainly focuses on Teachers' teaching attitude, teaching methods, sports ability, moral quality and teaching effect, while ignoring the innovation ability and teaching and scientific research ability of physical education teachers, as well as the degree of students' participation and classroom atmosphere. Therefore, most physical education
teachers focus on the careful design of physical education teaching and the use of teaching skills, pay attention to the external performance of teachers, ignore the essence of evaluation, and ignore the learning attitude and enthusiasm of students.

4.3. Analysis of PE Teaching Evaluation

![Figure 2. Analysis of evaluation content](image)

According to figure 2, the evaluation content of students' physical education teaching mainly includes sports theoretical knowledge, sports skills, classroom performance and physical quality, while the evaluation of students' innovation ability, sports interest and mental health level is ignored. Therefore, in the evaluation content, too much attention is paid to some common contents, while ignoring the individual differences of students.

| Table 2. Evaluation Method (n = 30) |
|-------------------------------------|
| Evaluation results | Diagnostic evaluation | Formative assessment | Summative evaluation | Quantitative evaluation | Qualitative evaluation | unclear |
| Number | 1 | 4 | 22 | 20 | 5 | 4 |
| Proportion | 3.33% | 13.33% | 73.33% | 66.67% | 16.67% | 13.33% |

As shown in Table 2, in terms of evaluation methods, summative evaluation is first emphasized, while the progress of each individual in each stage of learning is ignored; secondly, quantitative evaluation is emphasized while qualitative evaluation is ignored. Therefore, the evaluation process is very closed, static, lack of flexibility and dynamic evaluation, the promotion of students' development is limited.

5. Conclusion
Under the current background, the important goal of college sports is to improve students' health.
National education departments and schools need to understand the overall physical health test of students in order to improve the school sports work, and students need to understand the individual physical fitness data to participate in targeted physical exercise. It has high application value to establish a data platform for college students' physical health test which integrates data collection, management, application and other functions. In view of this, this paper focuses on the theoretical design of functional modules of College Students' physical health test data platform. To achieve the teaching results of intelligent physical education. Through the survey, basically no students choose public physical education courses because they want to improve their physical quality. Therefore, it is necessary to design the recommended public sports course options based on the data of students' physical health monitoring. Through the data analysis, most of the teachers stay in the theoretical knowledge and action, ignoring the students' psychological state and innovation ability, which needs to be strengthened.

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