ISSN 2663-8169 Vol. 6, Issue 4: 207-216, DOI: 10.25236/IJNDE.2024.060435

Refined Management of Sports in Colleges and Universities and Information-based Innovative Education Driven by Big Data

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Abstract: *On the basis of comprehensively grasping and understanding the potential of big data technology transformation, various regions proposed to make full use of data, technology and other production factors to build information-based education and explore new ways of providing educational services. In institutions of higher learning, P.E (physical education) is often a key component of a quality curriculum that supports students' healthy development in both their academic and personal lives. However, there are still fundamental problems in the P.E of many institutions of higher learning at the present stage. This paper applied big data technology to the field of P.E, and built a personalized P.E system, an ecological P.E learning environment, and a holographic learning evaluation platform. It has carried out innovative research on the P.E model to promote the realization of the refined management of sports in institutions of higher learning and the realization of information-based innovative education. The main factor driving the development of the new model is still people. Therefore, this paper tested the satisfaction of college P.E teachers to the new model of refined management and information-based innovative education through experiments. The experimental results show that the college P.E teachers in the test sample are highly satisfied with the use of the new model, reaching about 81.67%. This provides a reference for the development and promotion of college sports refinement and informatization education system.*

Keywords: *College Sports Management; College Physical Education; Big Data; Information Teaching*

1. Introduction

Big data technology has given a new direction to the reform of physical education, and also provided a new standard for the cultivation of sports talents in colleges and universities. On the basis of the above background information, this paper constructs a new model, which helps to improve the intelligent level of physical education teaching in colleges and universities, and lays the foundation for the logical upgrading of physical education teaching reform.

There are some studies on P.E in institutions of higher learning by scholars. Yang L examined the challenges in implementing flipped classroom instruction in institutions of higher learning based on the content and application value of this method. He suggested developing students' study skills, enhancing P.E instructors' information literacy, and creating an information-based educational system [1]. In order to facilitate the sharing of teaching resources, disseminate teaching information, communicate with teachers and students, display learning results, conduct sports activities in institutions of higher learning, and assess the effects of learning, Yang J built a teaching platform based on Tencent integrated software [2]. Di P firstly investigated and understood the research situation of multimedia teaching system in college P.E. Secondly, he comprehensively researched and analyzed related theories and technical foundations and other topics. Thirdly, based on this analysis, he developed a strategy for implementing the multimedia teaching system for P.E in institutions of higher learning and examined every step of the way. Finally, he conducted tests to test the functionality of the new multimedia system, compared and statistically analyzed the findings, confirmed the viability and efficacy of the new approach using particular data, and confirmed the relevance and viability of the study [3]. To better support the innovation of P.E teaching and the transformation and upgrading of P.E in institutions of higher learning, Zhou N believed it was crucial to increase the awareness of P.E teachers to use information technology to carry out P.E teaching in institutions of higher learning. He presented the innovation route based on the existing state of the application of information technology in order to offer creative suggestions for the subsequent P.E instruction in institutions of higher learning [4]. Jin H presented a reform approach for P.E that uses network distance teaching as its central component and

ISSN 2663-8169 Vol. 6, Issue 4: 207-216, DOI: 10.25236/IJNDE.2024.060435

provided a brief introduction to the idea and elements of computer remote education in light of the ongoing advancements in network distance teaching technology. He ultimately made a case for the importance of changing P.E [5]. The above research analyzed the P.E in institutions of higher learning.

Many scholars have conducted research on big data sports teaching. The growth of P.E in institutions of higher learning was significantly aided by Liu F's explanation of the use of intelligent analysis and decision-making in the classroom and his use of big data to students' interest orientation and P.E [6]. Li Z carried out study on the big data-based practice innovation approach for college P.E. The objective was to examine and evaluate the efficacy of P.E at institutions of higher learning using a variety of approaches, including surveys, interviews, comparative analysis, field research, and mathematical statistics. He enhanced the theoretical research system of P.E in institutions of higher learning, broadened the research field of the application theory of P.E in institutions of higher learning, and promoted the interdisciplinary theory of P.E in institutions of higher learning in order to offer recommendations for the development of P.E courses in institutions of higher learning [7]. College students and professors participated in a questionnaire survey that Qian Y performed using the big data intelligent physical testing platform. Through study and analysis, it can be found that less than 5% of instructors pay attention to this issue, and that the present college teachers' creative training of students' P.E instruction was plainly insufficient [8]. Through extensive study on the present state of P.E instruction in the big data environment, Cheng P analyzed many causes for the delay in the allocation of resources for P.E. Using big data technologies and the fundamental principle of P.E instruction, he put forward the optimization and allocation of teaching resources in a targeted manner [9]. Zhang L used big data and other network technologies to realize the intelligent development of school sports through the new model of cloud platform P.E [10]. Hu Y explored the potential use of big data technology based on network teaching platform in college P.E in light of the distinctiveness of big data teaching material [11]. The research of the above scholars has made quite effective progress in the level of big data sports teaching.

At present, a large number of P.E reforms in institutions of higher learning are only keen on formal reforms. The concept of big data intelligent education has not been further implemented, so that the enthusiasm and autonomy of college students' sports learning has not really improved, and targeted reforms are needed.

2. Problems Existing in P.E in Institutions of Higher Learning

(1) The teaching concept is outdated

The teaching concept of most P.E teachers is still in the stage of traditional P.E and has not been fundamentally changed [12]. Another aspect is that the relevant teachers engaged in P.E work do not have the teaching reform theory adapted to the development of the new era as a guide and practice. This has led to a lack of knowledge among many P.E teachers on how to apply the idea of intelligent P.E. Additionally, institutions of higher learning tend to focus more on professional teaching and largely disregard P.E instruction on the basis of conventional teaching approaches. As a result, the majority of P.E changes are merely formalities to varied degrees, which has a significant impact on how institutions of higher learning promote P.E reform and how much they can enhance teaching standards.

(2) The teaching methods are backward

Teaching methods play a decisive role in teaching quality and teaching efficiency [13]. At present, the requirements of students in institutions of higher learning for P.E have gradually turned to be individualized and diversified. At the same time, indoctrination teaching has little improvement in students' learning ability, innovation ability and practical ability, which greatly reduces the effectiveness of P.E teaching. Secondly, although cloud computing, Internet of Things, big data and artificial intelligence have been promoted and applied to classroom teaching in institutions of higher learning. The scope of their application to P.E methods is still very limited and the degree of application is not deep enough, so that P.E methods cannot be fundamentally innovated.

(3) The teaching objectives are vague

The vagueness of P.E teaching objectives in institutions of higher learning is mainly manifested in that the teaching objectives are not clear enough. In the practice of P.E teaching, the teaching objectives formulated by some P.E teachers' teaching plans are very unclear. Generally, the teaching requirements for students are expressed in terms of "knowing", "mastering" and "understanding". This kind of evaluation index is not specific enough, it is difficult to judge whether the P.E learning of college

ISSN 2663-8169 Vol. 6, Issue 4: 207-216, DOI: 10.25236/IJNDE.2024.060435

students has reached the real learning level, and it cannot judge whether the optimized teaching content has reached the ideal level. Secondly, P.E teachers often mistakenly equate students' teaching goals with learning goals. The two have many similarities in some aspects, but they are essentially different after all. If the two concepts are conflated, it would weaken the role of P.E goals in stimulating, guiding and evaluating.

The problems existing in P.E in institutions of higher learning are shown in Figure 1:

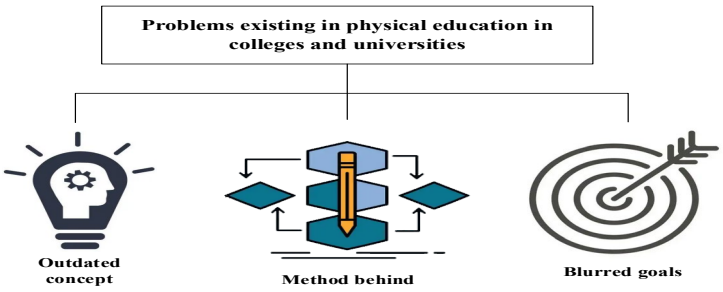

Figure 1: Problems existing in physical education in institutions of higher learning

3. Construction of a Refined Management Model for Sports in Institutions of Higher Learning

(1) The direction of refined sports management in institutions of higher learning

Refinement management theory is an enterprise management concept, which is a subdivision of the traditional management system, and emphasizes organizational division of labor and standardized processes to maximize efficiency [14]. However, there are currently only a small number of research on the effective administration of P.E in institutions of higher learning. The majority of P.E at institutions of higher learning is broad and conventional, concentrating on students' practice and professors' demonstration acts. The breadth of P.E at institutions of higher learning is expanding as a result of the ongoing development of the times. There are horizontal contents like the assessment and construction of P.E disciplines, the management of P.E knowledge and cultural construction, and the construction of P.E and research groups in addition to the traditional management of P.E, the supervision of sports conditions in free time, and the management of funds and equipment.

The difficulty faced by the refined management of sports in institutions of higher learning is that the huge amount of data is difficult to process, and the type of information required is extremely complex [15]. If people simply rely on manual sorting, it would result in low analysis efficiency, high cost, and violation of refined management expectations, so it is unrealistic. The introduction of big data in sports management in institutions of higher learning is inevitable. With the means of P.E management relying on big data, the operability has been greatly enhanced.

(2) Clarify the functions of P.E teaching

A big data platform can manage all important P.E teaching departments in a coordinated manner, support the transformation of P.E operations, and create a complete smart P.E management system against the backdrop of the new era. There are four levels of transformation:

In terms of coordinating the allocation of educational resources, big data technology can not only integrate and optimize the original P.E resources, but also enhance the correlation between the data platform and student groups. When carrying out classroom teaching activities, big data technology can promote the transformation of P.E teachers from leading to auxiliary roles, and mobilize students' subjective initiative in learning. For the group of P.E teachers, big data technology can give full play to the advantages of P.E teachers' teaching ability. By fully integrating its own teaching methods and teaching concepts into the data platform, it is presented to students in a variety of ways. For the student group, the use of big data technology can choose the exercise method that is more suitable for their own physical exercise program, so that the exercise effect in the P.E curriculum arrangement of institutions of higher learning can be better improved. The functions of P.E teaching are shown in Figure 2:

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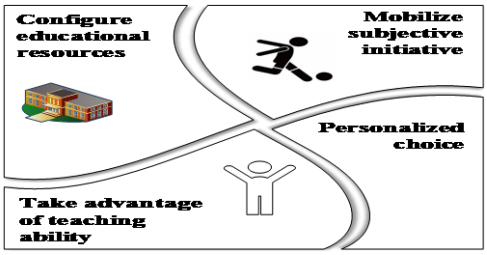

Figure 2: Physical education function

(3) Develop P.E teaching theory

Under the background of the era of big data, the development of the theoretical level of P.E depends on the support of theoretical data [16]. First of all, the analysis through the algorithm can effectively promote the improvement of the theoretical level of P.E. Secondly, it can be combined with the current teaching situation to sort out, and then provide high-quality guidance for P.E activities. Ultimately, under the impetus of big data technology, systematic and dynamic reform and innovation would be carried out. Based on its own application characteristics, big data technology builds an open and networked teaching platform, conveys theoretical knowledge of P.E in various ways, and develops more distinctive P.E content. The theoretical development process is shown in Figure 3:

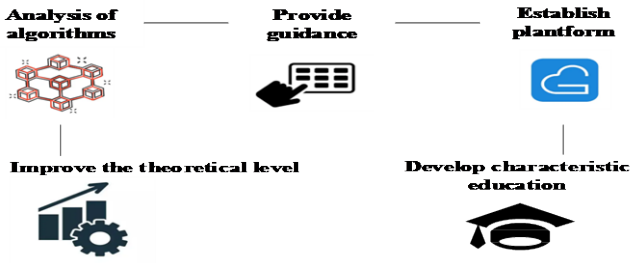

Figure 3: Theory development process

(4) Design a feedback mechanism for P.E teaching information

Applying big data technology to wearable devices can more accurately determine the movement of each student when participating in different sports. After the health data is collected by the relevant technicians, the data is synchronized on the big data platform to develop a personalized approach for the students. Finally, according to the analysis results, we can judge the actual differentiated needs of students' physical exercise, and collect students' exercise data more accurately.

4. Construction of Innovative Model of P.E in Institutions of Higher Learning

Based on big data technology, this paper constructs a new model of college sports refined management and information innovation education. The new model mainly includes three levels, namely: personalized P.E teaching system, ecological P.E learning environment and holographic learning evaluation platform.

(1) Personalized P.E teaching system

It is a core requirement to carry out personalized sports learning services for students. With the support of big data technology, the personalized P.E system can analyze students' physical exercise preferences, weak links and specialties based on students' physical data. It can make personalized service decisions, such as personalized path planning, adaptive resource recommendation, etc. At the same time, the personalized sports learning system can make appropriate adjustments to the teaching plan according to the heterogeneous needs of students. Finally, the P.E project is used as a unit, and big data technology is used for accurate calculation, and the schedule to meet the needs of students is updated every week.

(2) Ecological sports learning environment

The ecological sports learning environment is a combination of online and offline environments based on technology enhancement. Different institutions of higher learning can choose different sports learning situations according to their own conditions. In the ecological sports learning environment,

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there are two representative teaching modes: maker learning and flipped learning. Maker learning refers to the target objects of P.E, who practice offline according to the physical exercise tasks arranged online, and receive operational guidance from P.E teachers or experts in physical exercise. Flipped learning refers to the learning of P.E knowledge before class and the practice of physical exercise in class. The pre-class learning platform for students would also start tracking records and input students' sports learning data. P.E teachers can determine the teaching plan, the P.E content of the next lesson, or the students who need to focus on, etc. based on the feedback data.

(3) Holographic Learning Evaluation Platform

The holographic learning evaluation platform is based on data and organically integrates big data technology and cloud computing. The framework of the holographic learning evaluation platform is as follows:

The holographic learning evaluation platform can automatically record and monitor the behavior of students engaged in P.E courses, as well as test scores during and after the study. It then automatically shapes the sports learning portraits of college students. Teachers and related staff can transmit data to the cloud platform in real time to analyze the psychological state of students. For example, the degree of excitement and tension is analyzed based on speech recognition technology, and the academic emotions are analyzed based on facial expression recognition technology, so as to effectively track the psychological state of students. So far, the holographic learning evaluation platform has got rid of the constraints of behavioral data, and can simultaneously provide more accurate data to P.E target objects in the two dimensions of psychology and behavior. The holographic learning evaluation platform can use EEG, ECG and other brain science or neuroscience to evaluate students. The physiological data such as PEG and EEG are not subject to manipulation by subjective consciousness. Independently regulated by the nervous system, it can more objectively reflect students' learning emotions. Therefore, the holographic learning evaluation platform can collect this kind of information through multiple channels, and use this information as the basis for judging students' learning evaluation results.

The innovation model of P.E in institutions of higher learning is shown in Figure 4:

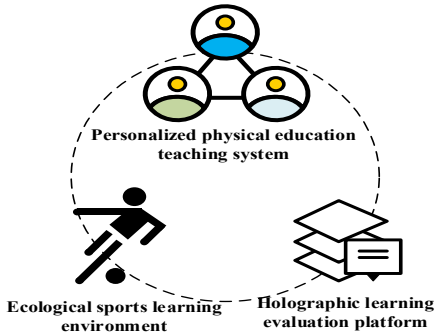

Figure 4: The innovation model of physical education in institutions of higher learning

5. Technical Points of Innovation Model of P.E in Institutions of Higher Learning

(1) Recommendation algorithm based on collaborative filtering

Currently, there are many researches on recommender systems and there are many design methods. Its popularity adopts two methods, content-based and collaborative filtering [17]. This paper uses collaborative filtering to complete the personalized sports learning recommendation function. By estimating the preferences of a large number of existing users to recommend a specific individual user, it can calculate the similarity between users based on the user's historical behavior data and search for other user preferences similar to the target user's interests for recommendation. The Euclidean distance formula is shown in formula (1):

$$d(x,y)=\sqrt{\sum(x_i-y_i)^2} \tag{1}$$

To better express the similarity between users, it must be transformed to keep the result in the range of 0-1. The closer the distance is to 1, the greater the similarity between two users, as shown in formula (2):

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$$sim(x,y)=\frac{1}{1+d(x,y)} \tag{2}$$

The similarity method is shown in formula (3):

$$sim(x,y)=\frac{x\bullet y}{\|x\|^2\|y\|^2}=\frac{\sum x_i\bullet y_i}{\sqrt{\sum x_i^{\,2}}\sqrt{\sum y_i^{\,2}}} \tag{3}$$

In the formula, x represents the vector representation of user A's rating of the item, and y represents the vector representation of user B's rating of the item.

By decomposing the high-dimensional scoring matrix, two low-dimensional factor matrices are obtained, and the sum of the two factor matrices is used to approximate the original scoring matrix. The matrix decomposition is shown in formula (4):

$$C_{i,j}\approx A_i\bullet B_j=\sum_{p=1}^{k}a_{ip}\,b_{pj}=a_{i1}b_{1j}+a_{i2}b_{2j}+\ldots+a_{ik}b_{kj} \tag{4}$$

The least squares method is used to solve the sum of squares of errors between the actual rating matrix and the approximate rating matrix in the recommendation system, and the minimum value is obtained, as shown in formulas (5) and (6):

$$C_{i,j}=\sum_{(i,j)\in R}\left(S_{i,j}-J_{i,j}\right)^2=\sum_{(i,j)\in R}\left(S_{i,j}-A_i\bullet B_j\right)^2 \tag{5}$$

$$height=\sqrt{(x_1-x_2)^2+(y_1-y_2)^2+(z_1-z_2)^2} \tag{6}$$

Among them, S is the actual scoring matrix, and J is the approximate scoring matrix.

By iteratively fixing and seeking partial derivatives on non-fixed factors, the extremum that minimizes the loss function can be obtained [18]. The associative law of matrix multiplication is shown in formula (7):

$$B_j\bullet A_i^{T}\bullet A_i=B_j\left(A_i^{T}\bullet A_i\right) \tag{7}$$

The formula for the partial derivative of the vector is shown in formula (8):

$$\frac{\partial\left(A_i\bullet B_j^{\,T}\right)}{\partial B_j}=A_i \tag{8}$$

(2) Dimensional analysis of data validity

In the big data environment, due to its own characteristics of scale and high speed, the probability of data quality problems becomes greater [19-20]. Therefore, in order to evaluate the validity of data scientifically and reasonably in the big data environment, this paper mainly selects the integrity, correctness and compatibility of the data as the evaluation dimensions to evaluate it. The specific expression is shown in formula (9):

$$\bigcup_{i=1}^{p}f_i=F \tag{9}$$

Among them, F is the effectiveness rating dimension, and f_i is each dimension.

In different applications, each attribute of the data would have a different impact on the application, so the weight of each attribute is different. The weight is shown in formula (10):

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$$\sum_{j=1}^{m} w_j = 1 \tag{10}$$

The integrity function value of each attribute of the data is weighted and summed to obtain the integrity function value, as shown in formula (11):

$$B_1(R_i) = \sum_{j=1}^{m} w_j \times v(R_{ij}) \tag{11}$$

Apply the mean integrity distance ratio function as shown in formula (12):

$$U = A_{TM}(B_1(R)) \tag{12}$$

Similarly, the correctness value of the batch of data can be obtained, as shown in formula (13):

$$T = A_{TM}(B_2(R)) \tag{13}$$

Among them, T represents the correctness degree value.

The compatibility degree value of the whole batch of data is shown in formula (14):

$$F = h_T(B_3) \tag{14}$$

The weighted sum of the above dimensions can be used to obtain a comprehensive measurement model of data validity in the big data environment, as shown in formula (15):

$$G = E_1 \times R + E_2 \times T + E_3 \times F \tag{15}$$

Among them, E_1, E_2, E_3 are the corresponding weights respectively.

6. Experimental Research on Willingness of College P.E Teachers to Use New Model

No matter how sophisticated and efficient the configuration of an information-based teaching management system is, its promoters and bearers are still people. The smooth operation and popularization of the new model is inseparable from the cooperation of personnel, especially the participation of P.E teachers, and the willingness of P.E teachers in institutions of higher learning to manage information-based teaching is directly related to the effectiveness of its promotion. Therefore, it can be considered to speculate the intention of college P.E teachers in information teaching management through questionnaire survey. It provides reference and reference for the development of college sports refinement and informatization education system, and also avoids problems such as low enthusiasm and low utilization rate of system users after system development, resulting in waste of manpower and material resources.

In the experiment, 20 college P.E teachers were selected as samples, numbered A~T. A total of 20 questionnaires were distributed, 20 questionnaires were recovered, 20 valid questionnaires, the recovery rate was 100%, and the effective rate was 100%. The questionnaire takes college P.E teachers' informatization teaching management intention as the research object. The experiment is investigated from multiple levels and angles. The variables focus on various forms of the application of information-based teaching methods in the P.E classroom, involving the whole process of classroom teaching. A score greater than 2 is considered satisfactory, otherwise it is unsatisfactory. The questionnaire indicators are shown in Table 1:

Table 1: Questionnaire indicators

Type	Variable
Preparation before class	big data for personalized course warm-up
Preparation before class	Using information technology to prepare lessons
Classroom teaching	Teaching key actions using multimedia
Classroom teaching	Supervision using information technology
After-class evaluation	Evaluation using playback
After-class evaluation	Learning data is updated in real time

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(1) Satisfaction score of lesson preparation before class

Through big data technology, the process of students' quality change and physical growth is visualized, and the actual differentiated needs of students' physical exercise are judged according to the results, and students' exercise data are collected more accurately, and personalized customized learning methods are generated based on students' interest data. The pre-class preparation satisfaction score is shown in Figure 5:

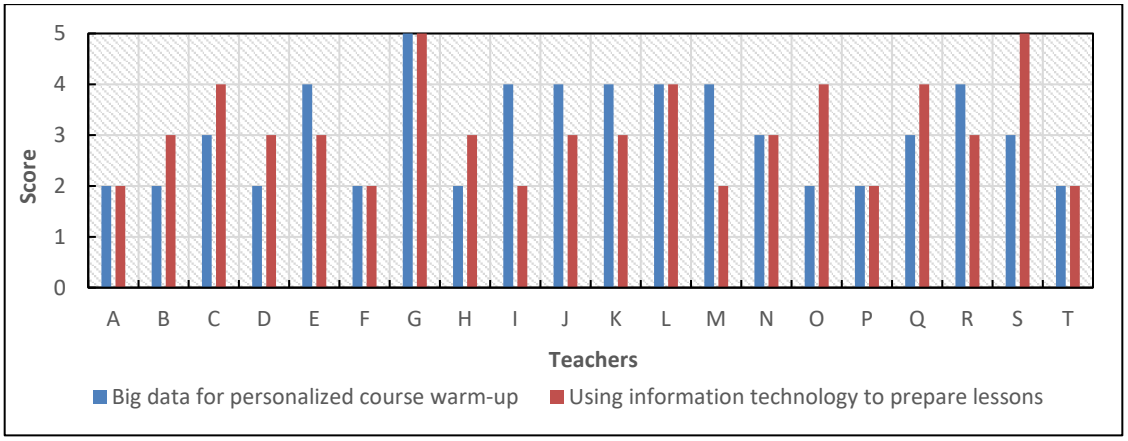

Figure 5: Satisfaction score of before class preparation

Figure 5 reflects the satisfaction scores of P.E teachers in the sample on using the new model to prepare lessons before class. Most teachers scored 3 points and above, and some teachers gave full marks. It is proved that most of the teachers in the sample are highly satisfied with the refined management of P.E and the new model of information-based innovative education in institutions of higher learning.

(2) Classroom teaching satisfaction rating

Teachers can use information technology to allow physical devices with data analysis functions to quickly analyze and process data. Based on edge computing technology and intelligent software or equipment, the offline space can conduct intelligent analysis of students' P.E classroom learning even without the Internet. The classroom teaching satisfaction score is shown in Figure 6:

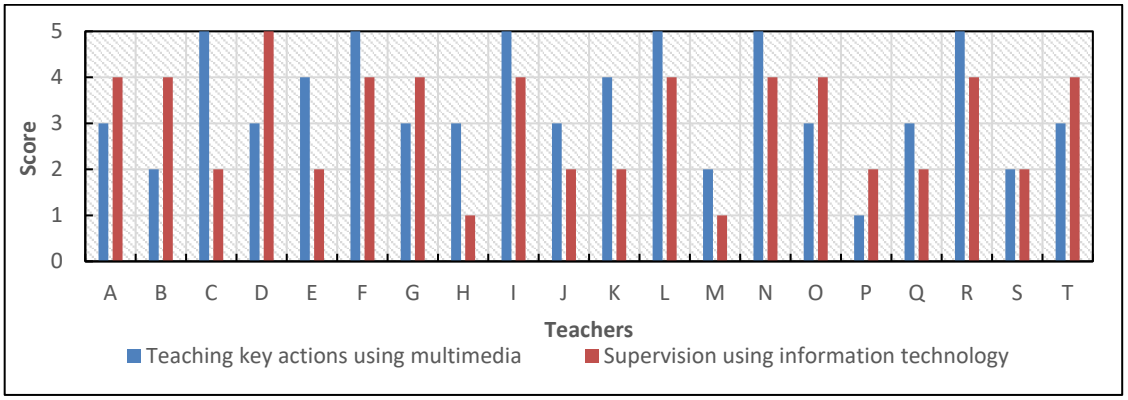

Figure 6: Classroom teaching satisfaction

Figure 6 reflects the satisfaction scores of P.E teachers in the sample on using the new model for classroom teaching. It can be seen that the scores of different teachers vary greatly and are extreme. However, the overall score greater than or equal to 3 points still accounts for the majority, which proves that the P.E teachers in the sample are more satisfied with the new model of classroom teaching.

(3) After-class evaluation satisfaction score

Using the new model, it can develop from explicit and general evaluation to process evaluation. The content of P.E evaluation would also change from a single evaluation focusing on students' athletic ability performance to a comprehensive evaluation focusing on students' sports skills, thus forming a dynamic and comprehensive evaluation mechanism. The post-class evaluation satisfaction score is shown in Figure 7:

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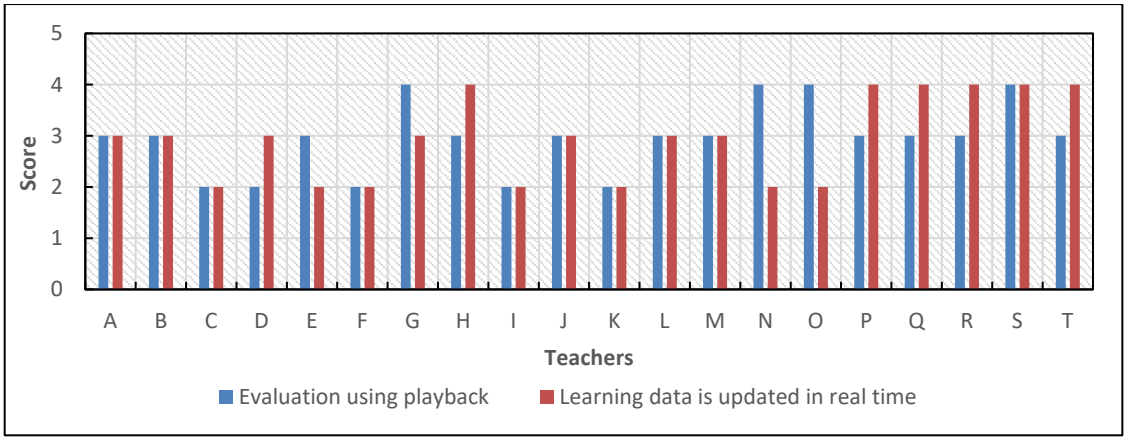

Figure 7: After-school evaluation satisfaction score

Figure 7 reflects the satisfaction scores of P.E teachers in the sample on using the new model for after-class evaluation. It can be seen that the difference between the scores of different teachers is small and relatively stable. There are no particularly outstanding scores, and there are also no low scores. It proves that the P.E teachers in the sample are satisfied with the after-class evaluation of the new model.

(4) Comprehensive satisfaction survey

In the experiment, the scores of the above sample teachers are calculated to obtain a comprehensive satisfaction score, as shown in Figure 8:

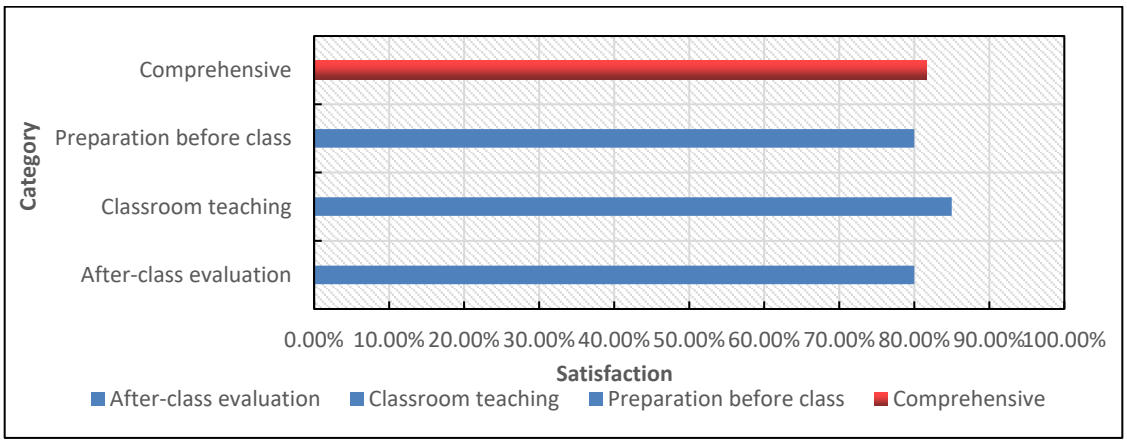

Figure 8: Comprehensive satisfaction survey

Figure 8 shows the percentage of satisfied people with each indicator and pre-class preparation, classroom teaching, and after-class evaluation. From this, it can be further calculated that the P.E teachers in the tested samples have comprehensive satisfaction with the refined management of P.E and the new model of information-based innovative education in institutions of higher learning, which account about 81.67%.

7. Conclusion

The advent of the era of big data brings new opportunities for the development of P.E in institutions of higher learning, and at the same time brings platform support and technical support to the intelligent transformation of P.E. The innovative P.E model is conducive to promoting the P.E in institutions of higher learning to continuously adjust its educational goals and directions with the development of the times. This paper applies big data technology to the field of P.E, and builds a personalized P.E system, an ecological P.E learning environment, and a holographic learning evaluation platform. The experiment obtained the results of pre-class preparation satisfaction score, classroom teaching satisfaction score results, after-class evaluation satisfaction score results and comprehensive satisfaction survey results. The establishment of an information-based innovative P.E model is conducive to strengthening the online and offline collaborative teaching level of P.E, creating a smart P.E teaching environment, and improving the quality of P.E in institutions of higher learning.

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References

[1] Yang L. Difficulties in Implementing Classroom Teaching in College physical education and Countermeasures. Bulletin of Sport Science & Technology, 2017, 8(1):41-53.
[2] Yang J, Tang L, Dong J. Construction and Realization of SPOC Teaching Platform for College physical education Course Based on the Tencent Intergrated Software. Journal of Hunan Institute of Engineering (Social Science Edition), 2017, 12(4):23-28.
[3] Di P, Hongye L. Research and application of multimedia teaching in college physical education. Agro Food Industry Hi Tech, 2017, 28(1):339-342.
[4] Zhou N. Research on the Innovative Development of College physical education Teaching Mode under the Environment of Computer Technology and Network. Journal of Physics Conference Series, 2021, 1992(2):21-22.
[5] Jin H, Li S. Research on Computer Network Distance Teaching and College physical education Reform. Journal of Physics Conference Series, 2021, 1915(3):32-61.
[6] Liu F. The Reform of College physical education Teaching Methods under the Background of big data. Journal of Physics: Conference Series, 2021, 1744(3):32-50.
[7] Li Z. Sports Teaching Practice Innovation Mode Based on big data Technology. Journal of Physics Conference Series, 2021, 1852(2):22-23.
[8] Qian Y. Application of big data Technology in Smart Sports Teaching Summary. Journal of Physics: Conference Series, 2021, 1881(4):25-42.
[9] Cheng P, Ming D, Man X. Optimized Allocation of Tennis Teaching Resources Based on big data. Journal of Physics Conference Series, 2021, 1744(4):62-138.
[10] Zhang L, Wen M, Huang J. The Realization of Sports Intelligence Based on the Perspective of Students' Physical Fitness. Journal of Physics Conference Series, 2021, 1992(4):42-68.
[11] Hu Y, Ma J. Exploring the Application of Web-based Sports Teaching Platform for big data Teaching. Journal of Physics: Conference Series, 2021, 1915(2):22-77.
[12] Engelhardt S, Hapke J, Tpfer C. Implementation and effectiveness of cognitive-reflexive activating physical education: a scoping review[C]// AIESEP-Conference. 2021, 15(6):125-142.
[13] Li M, Zhong J. Elements and Overall Optimization of University Self-Organizing physical education Teaching System Based on Holistic Theory. Scientific Programming, 2022, 2022(11):15-18.
[14] Hsu W T, Shang I W, Hsiao C H. Perceived teachers' autonomy support, positive behaviour, and misbehaviour in physical education: The roles of advantageous comparison and non-responsibility. European physical education Review, 2021, 27(3):529-542.
[15] Jumareng H, Patah I A, Mongsidi W. Introvert and extrovert personality: Is it correlated with academic achievement of physical education, Health and Recreation students at university level? JOURNAL SPORT AREA, 2021, 6(2):140-146.
[16] Zhou N. Research on the Innovative Development of College physical education Teaching Mode under the Environment of Computer Technology and Network. Journal of Physics Conference Series, 2021, 1992(2):22-121.
[17] Blegur J, Tlonaen Z A, Lumba A. The Importance of Self-Esteem to Students Learning Responsibilities and Group Learning Commitment of physical education Students. JETL (Journal Of Education Teaching and Learning), 2021, 32(5):88-165.
[18] Lanier K, Killian C M, Wilson K E. K-12 physical education Participation and its Impact on Student Anxiety, Depression, and/or Stress: A Scoping Review[C]// 2021 Meeting of the International Association for physical education in Higher Education. 2021, 13(9):51-56.
[19] Takin C, Canli U. Adaptation of The Nomophobia Scale to The Field of physical education and Sports: Alternative Models Strategy Measurement Model Test. Sports Sciences Association, 2021, 343(2):21-38.
[20] Ma H F, Lv H. Research on Application of Quality Development Training in Higher Vocational physical education. Clausius Scientific Press, 2021, 3(4):32-45.