



Application of Random Simulation Algorithm in Practical Teaching of Public Physical Education in Colleges and Universities

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Abstract. This paper studies the application of random simulation algorithm in the practical teaching of Public Physical Education in Colleges and universities. When the current national physical education gives new goals and requirements to college physical education, the limitations and one sidedness of the old teaching mode and method appear. In the simulation part of public physical education practice teaching, the quantitative scoring method in public physical education practice teaching and comprehensive evaluation method is used as the simulation basis. When determining the range of public physical education practice teaching and historical public physical education practice teaching data, according to the degree of detail of the historical data they have, A fuzzy cluster analysis method based on fuzzy equivalence matrix is proposed to classify the unknown, and pay attention to the unity and standardization of teaching form, structure, content, method, examination and evaluation. The distribution function of public physical education practice teaching is obtained through statistical analysis and test of historical data, and the random number of this public physical education practice teaching is generated by computer. According to the specific bid evaluation methods and scoring rules in the teaching documents, a public physical education practice teaching interval or public physical education practice teaching value with high scores in public physical education.

Keywords: Random simulation algorithm · Public sports · Practical teaching

1 Introduction

Nowadays, the administrative system of rest education in China is the Ministry of Physical Education (Teaching and Research Office), and the main task of the Ministry of Physical Education (Office) is to complete physical education. Colleges and universities in China does not have a special system to manage theoretical teaching. Many teachers believe that theory accounts for less class hours and there is no need to engage in special management. College students have received physical education in primary and secondary schools for more than ten years. It can be said that they have a certain foundation in sports technical skills, but their theoretical knowledge is extremely poor. Sports not

only shoulder the task of physical exercise, but also promote the healthy development of College Students' body and mind through sports [1]. Sports has produced a large number of human body movement laws around sports practice, and these laws are the theoretical basis for guiding physical development. Therefore, the sports department should set up a special theoretical teaching and research department. The director of the teaching and research department should pay attention to the management work, strengthen the construction of theoretical teaching materials and teaching aids, reasonably allocate theoretical teaching personnel.

Physical exercise is the main characteristic of physical education, so the teaching of technical skills should occupy an important position and a large proportion in the highest stage for students to receive education in school, so this section of technical skills teaching should have a certain depth and difficulty. This depth and difficulty should not be reflected in the high level of technology and skills that he has acquired, but in the fact that they should have certain biomechanical knowledge to understand the formation principle of sports technology skills and certain sports physiology knowledge to understand sports technology. The role of the formation process of skills on the development of human body and learning how to measure and evaluate yourself in the process of sports to obtain the ability of scientific exercise. In short, physical education in Colleges and universities should make full use of the guiding role of physical education theoretical knowledge in physical education practice, so that students can truly "know why" in the process of learning technical skills. Practical teaching of Public Physical Education in Colleges and universities is an effective way to learn sports theoretical knowledge and master sports skills [2]. It is an important means to enhance students' physique, improve students' physical health and improve students' physical quality. With the implementation of a series of measures to deepen the reform of college education system in China, the reform of public physical education practice teaching in Colleges and universities from concept, content to method and means has begun to be beneficial exploration.

Physical education is the main form of school physical education. This is a targeted, organized and organized learning process, which meets certain learning standards and courses. Bilateral activities include training of teachers and students. Listening, observation, learning and evaluation are the most common teaching and research activities. This is of great significance to change PE Teachers' teaching skills, improve their skills, improve teaching quality, develop teaching research, teaching reform and quality education.

This paper studies the application of random simulation algorithm in public physical education practice teaching in Colleges and universities. The development of modern science and technology puts forward new requirements for physical education teaching mode. Under this new requirement, the random simulation algorithm assisted teaching, which is different from the traditional teaching mode, will become the trend of physical education teaching reform. Random simulation algorithm technology involved in physical education teaching process is bound to affect physical education teaching mode. Put forward new requirements in teaching methods and teaching design [3]. As a teaching leader, physical education teachers should fully realize the importance of random simulation algorithm technology, and reasonably carry out teaching design according to the

cognitive characteristics of students, in order to improve the quality of physical education teaching and cultivate students with comprehensive quality. Therefore, physical education teaching should take the initiative to seize the opportunity.

2 Related work

2.1 Stochastic Simulation Algorithm

Simulation, also known as simulation, is a technology that imitates the research object by other means.

Stochastic simulation, also known as Monte Carlo simulation, statistical test or random sampling, is to sample according to the distribution characteristics of random variables to simulate the occurrence of real systems, so as to calculate the asymptotic statistical estimation of random variables. Its theoretical basis is to use sample parameters (sample mean and sample variance) to estimate the overall parameters. With the development of computer science and the in-depth study of simulation theory, random simulation method has been widely used in engineering [4]. The purpose of system simulation is to provide decision-making basis for the final public sports, that is, to select a certain public sports interval or several public sports in order to achieve the optimal goal – medium The bidding probability is the highest and the expected profit is the best. As shown in Fig. 1.

$$\lim_{k \rightarrow \infty} y_k(t) = y_d(t) \tag{1}$$

The main advantage of applying stochastic simulation is that it can make quantitative analysis of the problems to be solved by the system quickly and economically. However, this method also has its own inherent disadvantages: stochastic simulation is only a numerical calculation method, which does not have the optimization function. Each simulation can only get a workable solution, but not a general solution. If you want to get the optimal solution or satisfactory solution, Through multiple simulations, it has the weakness of enumeration method, and its simulation results are not as accurate as those obtained by analytical method.

$$e_j = -k \sum_{i=1}^n f_{ij} \ln f_{ij} \tag{2}$$

How to accurately determine the distribution type of random variables according to the mastered data is not a simple thing. It needs to be inferred with the help of certain methods. The commonly used methods in teaching are histogram method and probability diagram method.

The evolutionary algorithm only needs to calculate the value of the objective function, and the requirements for the nature of the optimization problem itself are very low. Unlike the mathematical optimization algorithm, it often depends on a lot of conditions, such as whether it is convex optimization, whether the objective function is differentiable, whether the derivative of the objective function is lipschitzcontinuity, and so on. For example, the design of the vehicle dynamics model mentioned above is constrained by the fluid partial differential equation. At this time, you don't know whether

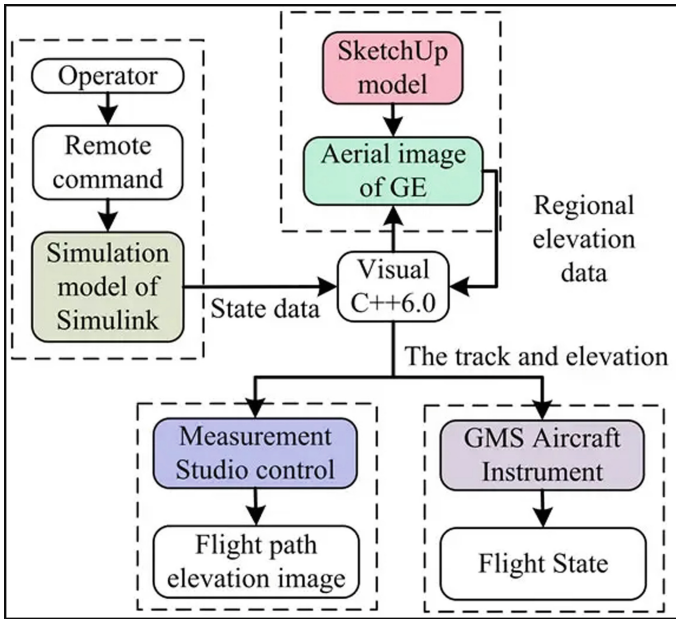


Fig. 1. Principle of random simulation algorithm

the objective function is convex, differentiable or not. This is the biggest advantage of evolutionary algorithm over mathematical optimization algorithm [5]. In fact, it is also a disadvantage of evolutionary algorithm, Because the problem independent nature works well for all problems, it often means that we do not make full use of the characteristics of different problems to further accelerate and optimize the algorithm (there is a philosophical dialectic that advantages often lead to disadvantages). In this way, the rules and regulations of mathematical optimization algorithm actually delimit the scope of application of mathematical optimization algorithm. If it is out of this scope, we don't know whether it is easy to use or not, but within this scope, mathematical optimization can give a basic theoretical guarantee. Evolutionary computation methods based on some specific combinatorial optimization structures have actually introduced more information about the problem itself. This is why evolutionary computation can compare with traditional mathematical optimization in some combinatorial optimization problems. Figure 2 below shows the data used to generate the regression model.

For the optimization problem with determined problem structure, when there is sufficient information about the optimization problem to use, mathematical optimization generally has advantages, such as linear programming, quadratic programming, convex optimization and so on. On the contrary, evolutionary algorithms may have advantages. For some problems that can not be completely solved by mathematical optimization, such as NP hard problem, evolutionary algorithm also has great application prospects. More use of the structure of specific problems to design specific evolutionary computing algorithms is bound to improve the ability of evolutionary computing.

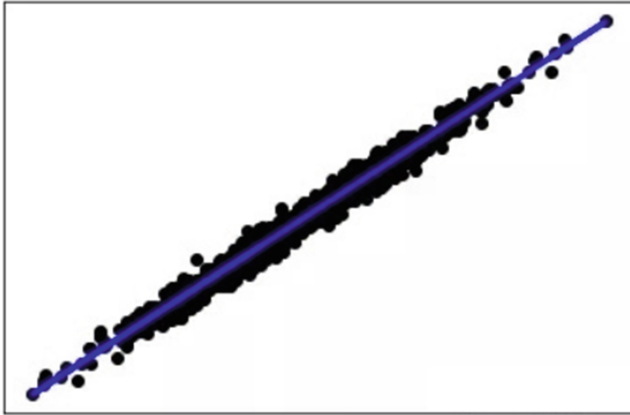


Fig. 2. Data of regression model

When it comes to randomness, this is probably a puzzling philosophical problem. What exactly random behavior refers to is best defined quantitatively. Kolmogorov once proposed a method to judge the randomness: for an infinite sequence of random numbers, it can not be described by its subsequence. J. N. Franklin believes that a sequence is random if it has the properties of each infinite sequence obtained by independent sampling from a uniformly distributed random variable. These definitions are not very precise and sometimes even lead to contradictions [6]. It can be seen how cautious mathematicians are when talking about this problem.

Random number generator is just an algorithm to generate random numbers that conform to a specific distribution. These so-called random number sequences are actually periodic.

There are a large number of random number generators, but finding a good, easy to transplant and industrial standard random number generator is a difficult goal. The standard method of generating non-uniform distribution is to generate uniformly distributed random numbers first, and then convert them into specific distributed random numbers.

2.2 Practical Teaching of Public Physical Education

On the origin of sports practical training, what is modern sports practical training, and the concept of sports practical training. In order to carry out reasonable physical practice training in public physical education teaching in Colleges and universities, we must first solve these problems.

Sports practice training originated in the Second World War. In World War II, the allied fleet was repeatedly attacked by German Nazi submarines. Few sailors survived after the ship sank, which greatly reduced the effective strength of the Allied forces. After detailed investigation and research, the Allies found that most of these sailors who could survive were sailors with good psychological quality. They saved themselves with tenacious will to life. Then, "Success does not depend on physical fitness, but on The concept of "is well known by people. After continuous evolution, physical practice training has gradually become a popular training form for modern people. It is characterized

by cultivating people's comprehensive quality, improving personality and returning to nature. The traditional training methods of unique creativity and personalized words have been preserved. This advanced training method was introduced in China in the 1990s, and physical practice training has become popular in China. It has become a fashion. Carrying out physical practice training in public physical education in Colleges and universities has become an important means to create a pioneering physical education teaching model.

The object and content of sports practice training have realized continuous innovation. The group receiving sports practice training and the employees of the company Students and other groups. The training objectives were expanded accordingly. The previous training objectives were mainly physical fitness and survival training. In order to meet the needs of modern life, the training objectives were extended to personality training, personal will training, management training and team spirit training [7]. In sports practice training, participants can exercise their will, realize the perfection of personality and effectively cultivate team spirit.

The so-called sports practice training refers to the scientific design of special facilities and environment, through the form of outdoor activities to enable participants to obtain the corresponding emotional experience. In the activities, cultivate the spirit of self defeating and enterprising, the consciousness of motivating others and good team consciousness. At present, China's sports practice training projects mainly include barrel rolling, trestle bridge and water floating Soft ladder, balance beam, etc. It can be said that the forms of sports practical training are becoming more and more diversified.

In the traditional sports teaching, students' interest is not greatly reduced. In the teaching process, many courses are too old. Although China's colleges and universities continue to improve the classroom teaching courses, the subjects set up in the teaching process are still relatively old traditional courses such as football and basketball. With the development of China's economy, students have enough opportunities to contact these sports after class. In this way, students are no longer satisfied with shallow teaching in class. The introduction of sports practice training in public sports can effectively promote the improvement of classroom teaching mode. It is favored by students with novel teaching ideas and teaching forms, and the classroom teaching effect is remarkable.

In physical training, students' comprehensive quality can be effectively improved. College sports practice training is mainly divided into personal quality training and team training. In personal quality training, individuals should complete the corresponding training items as required within the specified time. In this tense and stimulating process, students' psychological quality and physical quality have been improved. Moreover, due to the requirements of time, students will give up some items [8]. Students learn to give up appropriately in this process, which is of great significance to some blind and confident students. In team training, students should form corresponding training teams according to requirements. In team training, the student union establishes a good team consciousness and forms a healthy team culture. In order to complete the team project, team members must trust each other and actively communicate and communicate. Since then, the team consciousness of students has been improved. Most of the current college students in China are only children and do not form team consciousness in life, which

is inconsistent with the current situation of emphasizing team consciousness in modern society.

3 Application of Random Simulation Algorithm in Practical Teaching of Public Physical Education in Colleges and Universities

To carry out outward bound training in public sports teaching in Colleges and universities. The content selection of Outward Bound training is particularly important. Generally speaking, the forms of Outward Bound training are relatively flexible and diverse, and the operation is simple. According to the form of Public Physical Education in Colleges and universities, outward bound training can be divided into large and small classes. In small classes with relatively short class hours, it is mainly to cultivate students' personal quality. The selection of training items should also start from cultivating students' personal quality [9]. In random simulation, the simulation number n is the first parameter to be determined. The simulation times are directly related to the calculation accuracy. Theoretically, the greater the number of simulations n , the smaller the error caused by replacing probability with frequency or expectation with mean, and the higher the accuracy. However, blindly increasing the number of simulations will undoubtedly increase the running time of the program, and after the simulation reaches a certain number of times, the accuracy changes little with the increase of the number of times. The calculation method of simulation times n of random variables under given confidence and error conditions is introduced below.

In order to obtain the expectation of random variables, the public physical education teaching is simulated, and the sample mean value is used to replace the overall expectation. The error can be expressed as:

$$\|\Delta x_{k+1}(t)\|_{\lambda} \leq m_1 \frac{1 - e^{(b-\lambda)t}}{b - \lambda} \quad (3)$$

The overall distribution is unknown, and the number of simulation times IV of public physical education teaching is determined;

When the distribution type of the simulated best public physical education sample value is unknown and the sample is large, the central limit theorem is used to estimate the error:

$$e_{k+1}(t) = C(t)\Delta x_{k+1}(t) \quad (4)$$

Public physical education teaching data plays a decisive role in the process of selecting the type of probability distribution. Different public physical education teaching actually has different probability distribution. Generally, the distribution of public physical education teaching has the following characteristics:

- (1) There is a distribution interval (a, b) , in which public physical education teaching always takes a finite positive value;
- (2) In the interval (a, b) , the density curve of public physical education teaching shows a single peak continuous distribution;
- (3) The distribution of different public physical education teaching may be positive, negative and symmetrical.

It should be pointed out that the psychological characteristics of students are different. When designing the training content, we should comprehensively test the students' personality. For example, students with insufficient balance can strengthen the training of balance beam, and students with weak willpower can carry out roller ball training in a short time. The major course is mainly to cultivate students' team consciousness, so the selection of training items should focus on cultivating students' team consciousness. For example, two person kangaroo jump is a relatively difficult training project, but it requires a high sense of cooperation between the two [10]. In order to win, students should actively cooperate and make use of their own advantages to make up for the disadvantages of their peers, so that the students' sense of cooperation can be improved. In some colleges and universities with better conditions, the network wall can also be used for training. The main form is: the students combine by themselves, and each group of six people will complete the climbing of the net wall within the specified time. The members of the group shall not fall. If one falls, they will be disqualified from the competition, but the team members are allowed to rescue. The group with shorter time is the victory group, and the team consciousness of students climbing the net wall can be established, And formed a good habit of helping each other.

In the past, if the exact distribution of a variable is not known, it is generally assumed that the variable obeys the normal distribution, mainly because it satisfies the central limit theorem, that is, and the normal distribution is the limit distribution of many statistics. At the same time, many data processing methods with excellent statistical characteristics in theory are derived. However, the normal distribution is an unbounded distribution with symmetrical tail, which is not in line with the basic characteristics that the actual public physical education teaching intervals are bounded and non negative, and the public physical education teaching is not always a symmetrical distribution or a typical distribution, but mostly a close distribution. In view of this, this paper adopts multi parameter statistical distribution when simulating public physical education teaching β Distribution, and different values can be taken continuously through its parameters to represent various actual distributions and statistical characteristics of public physical education teaching, which may be closer to the actual situation than assuming that public physical education teaching obeys a typical distribution, and β The distribution has many advantages as follows.

Take different values through parameters (R, n) , β (\cdot , n) can be a smooth continuous distribution with symmetry or asymmetry, single peak or single valley, increasing

or decreasing, and can approach various typical distributions such as normal, triangular, trapezoidal, elliptical, uniform, anti sinusoidal, exponential, right angle, Rayleigh, etc. [11]. In addition, it can also approximate t distribution, F distribution, lognormal distribution, absolute normal distribution, truncated normal distribution, non central Rayleigh distribution, etc., as well as more complex distribution between them. so β The distribution has polymorphism that can approximate various actual distributions.

At the same time, β The distribution also has certain theoretical analysis characteristics.

Anyway, β The distribution has the characteristics of boundedness and polymorphism, which can not only be analyzed theoretically, but also convenient for practical calculation β It is feasible to generate the random number of public physical education teaching by distribution, which provides a convenient method for constructing different distribution forms of public physical education teaching.

4 Practical Teaching Model of Public Physical Education

Any mathematical model is based on certain assumptions. As an analytical modeling tool, stochastic simulation needs to follow certain rules in the modeling process of determining the best public physical education teaching interval.

Data preprocessing is mainly carried out through data cleaning, integration, selection, transformation, concept layer and so on. The main purpose of data processing is to delete 28 completed questionnaires and 25 unverified student health data. Data integration includes analyzing the basic information of students and the data elements in the questionnaire in the form of data sets. At the level of $\alpha = 0.05$, 8 of the 32 statistically significant variables are selected from the analysis, and a random simulation algorithm model of the influence of public physical education factors in Colleges and universities is established.

$$W_j = d_i / \sum_{j=1}^m d_j \tag{5}$$

$$P_{loss} = 1 - \frac{1 - p_0}{p} = \frac{p_0 + p - 1}{p} = \sum_{n=1}^N P_K \tag{6}$$

Participating in sports competitions helps to improve students' local skills. Compared with traditional educational institutions, the sports environment is relatively strange and complex, which may lead to complex changes in students' psychology [12]. Complex psychological changes will not only produce positive effects and emotional reactions, but also lead to negative effects and emotional reactions. In sports competitions, contestants must overcome the impact of environmental changes, maintain a stable state of mind through positive self-regulation, and achieve better results in the field of competition. As the number of students participating in sports competitions increases, their ability to participate in drama competitions also improves.

Second, the influencing factors include "preference level" and "teacher qualification level". Students have different degrees of love for sports, and their grades in public physical education classes are also different. Basically, students who like sports do better than students who don't like sports. Therefore, in the process of community sports practice

teaching, we should cultivate students' interest in sports and enhance students' learning motivation. Teachers' technical level is also related to students' academic achievements in community sports. Under the guidance of high-quality teachers, students' academic performance in sports is high.

In addition, the diversity of teachers' teaching means, the class hours of public physical education courses and students' physical quality are also closely related to students' performance of public physical education courses. Teachers use more teaching methods in the practical teaching of public physical education, and students' performance in public physical education is better. With the increase of class hours of public physical education courses, the opportunities for students to practice sports action technology are increased, and the students' performance in public physical education courses is also better. Students have good physical quality and master the basic movements of sports quickly [13].

Because of the different influencing factors, the teaching strategies of public physical education will also change. However, this change is not groundless, but there are certain laws. As long as we can find this internal law, we can make full use of it to guide public physical education teaching.

Because public physical education teaching is affected by many factors, public physical education teaching should be a function of these factors. Public physical education teaching decision-making can be understood as an optimization problem under constraints. Linear programming is a method to solve the optimization problem under constraints. Here, it can be assumed that the objective function p (final public physical education teaching) is linear, And has one or more constraints. Based on this, this paper puts forward the following public physical education teaching model. In order to facilitate the analysis of problems, it can be expressed by the following formula:

$$d_{k+1}(t) = f(t, x_d(t)) - f(t, x_{k+1}(t)) \quad (7)$$

The internal structure of random algorithm public physical education practice teaching model generator, such as fence structure and the distribution of hyperplane points, is also very important. There are specific detection methods for different generators [14]. Spectrum test is the most used in structure detection. Spectrum test is based on the maximum distance between adjacent parallel hyperplanes. The greater the distance, the worse the generator. As shown in Fig. 3 below:

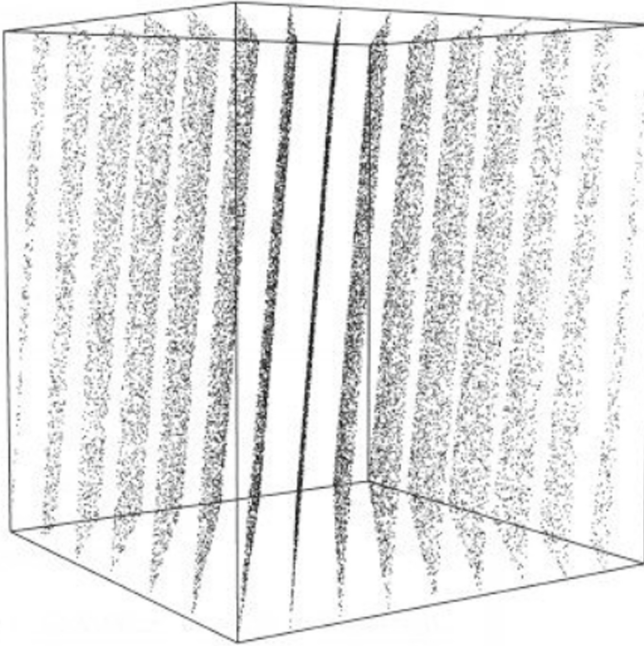


Fig. 3. Internal structure of random algorithm public physical education practice teaching model generator

In other words, the stochastic simulation model of the impact of university public physical education is the most important factor of the “number of participants” of decision-making institutions, followed by “preferences” and “teacher qualification level”. These have highlighted the important aspects that affect the teaching practice of Public Physical Education in Colleges and universities.

5 Conclusion

This paper studies the application of random simulation algorithm in the teaching practice of Public Physical Education in Colleges and universities, and gives the similar data of public physical education that simulates public physical education. On the basis of various models and statistical data, public physical education standards have been formulated, and public physical education institutions have been established. According to the specific evaluation rules stipulated in the evaluation method, the full coverage of public physical education has been achieved. Contestants can regularly participate in public sports activities to increase educational opportunities. Data mining is a process of automatically searching a large number of complex data sets by computer, and extracting hidden and previously unknown potential value information, rules and knowledge from high-quality, heterogeneous data and random data. Different from traditional statistical data analysis, the main feature of data extraction method is to obtain unknown, effective and useful information, rules and knowledge through data extraction method

without clear assumptions. The introduction of data extraction methods in college physical education teaching research has injected new impetus into the development of college physical education.

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