Educational Informatization in the Reform of Physical Education Teaching

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Abstract. In the Internet age, education has also entered the information age. The informatization of subject teaching has become the inevitable result of the development of education. Physical education is no exception. How to better apply information technology to all aspects of daily teaching is one of the major problems faced by PE teachers. Based on the general trend of education informatization, this paper discusses how to embody informatization in all aspects of physical education reform.

Keywords: SAS · Physical education

1 Introduction

With the vigorous development of sports and more scientific sports research, the role of sports statistics shows its importance more and more. We know that the factors, including physiological, psychological, technical and environmental factors, which come from the extremely complex factors that affect the human body's sports, undoubtedly affect the sports performance. Because of the fierce competition, it is obviously not enough for people to analyze human motion only by experience and simple data. At present, sports research generally needs to go through scientific analysis, that is, through quantitative analysis to qualitative analysis, so as to draw correct conclusions and carry out quantitative analysis, usually using the commonly used statistical methods and multi factor analysis methods in sports statistics. With the in-depth study of sports statistics, people are more and more aware of its role in the field of sports, especially with the continuous development of new technology, the introduction of information theory, cybernetics, system theory and electronic technology, sports statistics method has become one of the indispensable means in sports scientific management and training. At present, with the rapid development of China's sports and level, the number of sports in the leading position in the world is gradually increasing, and some backward sports in the past are gradually catching up with the world's advanced level. The improvement of sports performance, on the one hand, is the improvement of athletes' own quality, on the other hand, because we now have scientific management methods and training means, in which the use of sports statistical methods has been gradually promoted. In sports statistical methods, common statistical methods have been widely used in management and training, with

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the deepening of research and the popularization of computers, the use of multivariate analysis methods is also increasing. We have made statistics on Sports Science from 1984 to 1994. The following information can give us some enlightenment.

2 The Application of SAS System in the Teaching Reform of Sports Statistics

In sports science magazine, the proportion of sports statistical methods used in papers is about 50%, and it has reached about 60% since the 1990s. It can be seen that sports statistical methods are widely used in scientific research.

Common statistical methods still account for a large proportion in sports research. With the popularization of computers in the 1990s, multi factor analysis methods are gradually used in sports research, accounting for about 20% in the 1990s.

Due to the more and more important role of sports statistics in the field of sports, sports statistics courses have been set up in sports universities, sports colleges and sports departments of various colleges that train sports research, training and management talents [1–4]. At present, both undergraduate and college students in Beijing Normal College of physical education have set up the course of sports statistics, and graduate students have set up the course of multi factor analysis. Therefore, from the perspective of teaching in physical education colleges, more and more attention has been paid to sports statistics.

3 Q-Learning Algorithm

Q-learning algorithm is a milestone reinforcement learning algorithm, which was proposed by Watkins in 1987. It is a Markov decision process (MDP) in essence. It is a simple and widely used reinforcement learning algorithm, which has been widely concerned by experts and scholars in the field of artificial intelligence [5]. Q-learning algorithm does not need to establish an accurate environment model. It only learns the evaluation value of a certain action after it is completed, instead of learning the evaluation function of each state. In this paper, the Q-learning algorithm is introduced into the coordination control of SAS and EPS, which is just in consideration of the complexity of vehicle driving environment. By introducing the algorithm, it does not need to consider the impact of complex environment on the vehicle, only needs to evaluate the action after the action, and select the action through the evaluation value obtained.

The updated formula of Q value is as follows:

$$Q_{t+1}(S_{t+1}, A_{t+1}) \leftarrow Q_t(S_1, A_t) + a_t\left[R(S_t, A_t) + \gamma max Q_t(S_{t+1}, A_{t+1})\right]$$

Where γ is the discount factor and a is the learning rate.

The main advantage of q-learning is that it integrates the time difference method TD of Monte Carlo and dynamic programming, while calculating the value function under the cover of walking, of course, it is solved by Bellman equation (dynamic programming) [6]. The value of each state is determined not only by the current state but also by the

later state, so the current state value V (s) can be obtained by the cumulative reward expectation of the state:

$$V_\pi(s) = E(U_t|S_t = s)$$

$$V_\pi(s) = E_\pi\left[R_{t+1} + \gamma\left[R_{r+2} + \gamma[\cdots\cdots]\right]S_t = S\right]$$

$$V_\pi(s) = E_\pi\left[R_{t+1} + \gamma V\left(S^{`}\right)S_t = S\right]$$

The optimal cumulative expectation can be expressed by V * (s), and it can be seen that the optimal is the highest expectation of the current strategy

$$V^*(s) = max_\pi E\left[\sum_{t=0}^{H} \gamma^t R(S_t, A_t, S_{t-1})\pi, S = s\right]$$

Q-learning is an incremental online learning algorithm, which is mature and effective, and its convergence has been proved.

4 The Application of SAS System in the Teaching Reform of Physical Education Measurement and Evaluation

With the popularization of computer in our country, the data processing in statistics can be completed by computer, which brings us great benefits. The calculation speed is doubled and accelerated, and when we use large samples to analyze problems, we will not worry about the calculation problems. But in the past computer data processing, we have to write a program first to carry out the operation, which brings inconvenience to many people, because not everyone can easily master the method of programming [7–9]. In this case, computer experts solved this problem for us, they developed a software package for statistical processing, including SAS statistical software.

For SAS statistical software, people can generally master how to use it by learning for a short time. SAS software includes data processing methods of common statistics (such as calculation of mean and standard deviation, hypothesis test method, variance analysis, etc.) and data processing methods of multi factor analysis (such as regression analysis, discriminant analysis, cluster analysis, principal component analysis, etc.), It is easy to master, so the introduction of SAS software has brought great benefits to our statistics teaching.

5 The Logical Origin of Practical Teaching Reform of Physical Education Major

5.1 Develop Various Abilities

The goal of P.E. teaching speech major is to cultivate excellent P.E. teachers. The training process focuses on students' ability to master sports knowledge and skills, P.E. teaching

speech teaching ability and P.E. competition organization ability, so as to meet the needs of the country and Society for P.E. teaching speech talents. Results from the perspective of attributes, P.E. teaching talents should belong to applied talents, which is, to be exact, dynamic brain Good application, willing to do, hands-on type sports professionals. It can be seen that the various abilities of the students are determined based on the professional attributes, which is the natural responsibility of the physical education professional training unit [10]. In January 2018, the Ministry of Education promulgated the notice on the implementation of the measures for the certification of normal education majors in Yintong University (temporary), which highlights the importance of improving the ability of P.E. teachers to cultivate professional talents. The ability based orientation should become the concept of sports education professional talents training, It should be said that as an important part of the cultivation of physical education professionals, practical courses and teaching play an extremely critical role in improving the ability of physical education professionals.

5.2 Practical Courses

It is no exaggeration to say that the various abilities of physical education professionals are mostly obtained from the practice course teaching. However, for a long time, the training mode of physical education major in China has been subject oriented, and following this logical thinking has restricted the individuality and flexibility of talent training. The acquisition of students' ability is mostly just an accessory in the process of sports knowledge and skills teaching [11–14]. This kind of training logic orientation is easy to ignore students' sports practice ability, which is why many graduates of physical education major are difficult to understand the reason of being competent for the post of PE teachers in local primary and secondary schools. Therefore, the traditional discipline logic can not meet the needs of the training of sports business talents in the new era. We should shift from the discipline academic logic to the application ability oriented logic, reconstruct the ability oriented talent training program, and build a sports practice teaching and training system to meet the needs of the country and society.

6 SAS Can Improve the Teaching Effect of Physical Education Theory Course

The computer teaching and research section of our college has set up SAS software course for postgraduates since 1989. Students' study has laid a good foundation for the completion of graduation thesis. In recent years, according to the graduate thesis, when doing statistical analysis, we usually complete the data processing work through SAS software. But there are teaching problems [15]. On the one hand, the computer teachers are not very clear about the statistical content that students need to master when explaining SAS. As a result, some of the content should be introduced to students in detail but not specifically. Some of the content can be roughly understood but takes up a lot of time to explain. On the other hand, the statistics teachers still use the previous book method when explaining the multi factor analysis for students. The calculation process talks a lot, but the effect is not good, As a result, the teaching problems of repetition

and disconnection of the two courses are caused. In order to solve this problem, our computer and statistics teachers try to combine the multi factor analysis teaching of postgraduates with SAS statistical software teaching, That is to say, the statistics teacher explains the theoretical problems in the multi factor analysis, emphatically introduces the significance, concept, experimental design and data analysis of various statistical methods, while the computer teacher introduces the data content in the SAS software in the calculation part, so that the teaching difficulty in the statistics, that is, the calculation part, can be completed by the computer. In the second semester of the 1993–1994 academic year, we conducted the first round of combined teaching experiments. Before each chapter is taught, teachers of our two majors are discussing the content of statistics. Computers are going to talk about the content. After each class, they are going to discuss the problems they encounter. The general teaching process is: first, statistics teachers explain the meaning and concept of a certain method (this is the key explanation). The calculation method is just a rough introduction to the types and approximate steps of calculation methods [16]. After that, in the computer class, the computer teacher introduces how to use SAS software to process this statistical method and get the calculation results. In the statistical class, first analyze the SAS software calculation results made by examples in the computer class, and then talk about the new content. The introduction of each statistical method is basically completed according to this process. After a round of teaching, we have tasted the real significance of the teaching reform and found out many experiences.

7 Application of SAS Software in Statistics Teaching

The introduction of SAS software into statistical teaching has brought unexpected results to our statistical teaching, especially the teaching of multi factor analysis. First, it solves the calculation problem that has been perplexing the teaching of statistics. The data processing of various methods can be completed by SAS. The calculation speed is doubled, and the calculation result is accurate and reliable. Second, the focus of statistical teaching is shifted from the calculation method of the main lecture to the use and significance analysis of various methods of the main lecture. The problem of blind use of statistical methods by less students can be solved, which undoubtedly improves the quality of teaching. Third, because of solving the calculation problem, students' enthusiasm for learning has been improved, and teachers' enthusiasm for teaching has also been improved, which has played a positive role in promoting teaching. Fourth, the popularization of this kind of teaching will promote the scientific research of the college [17–19]. After many people master the method of statistical processing with SAS software, they can make more teachers join the ranks of scientific research, increase the number of scientific research articles using statistical methods, and indirectly improve the quality of scientific research. Of course, this combination teaching method is just in its infancy, and there are still many problems:

1) the teaching content of SAS software and multi factor and element analysis needs to be further determined, that is to say, their teaching characteristics and clear teaching content need to be established in the combination;

2) There is no doubt that the two courses will bring inconvenience to their teaching. Once a link is not well connected, it will disrupt the overall teaching effect. Although there are still some problems in the introduction of SAS software into statistics teaching, its advantages cannot be estimated. As shown in Fig. 1 and Fig. 2. It is necessary for us to constantly summarize our experience in the future teaching and solve the problems that may arise in time. We can also imagine that we can integrate the two courses in the next two years, that is, SAS software teaching as an experimental course of statistics teaching, which requires statistics teachers to master the SAS software teaching or computer teachers.

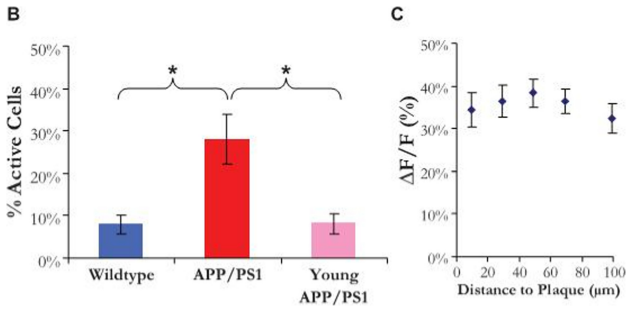

Fig. 1. Effect of SAS software teaching

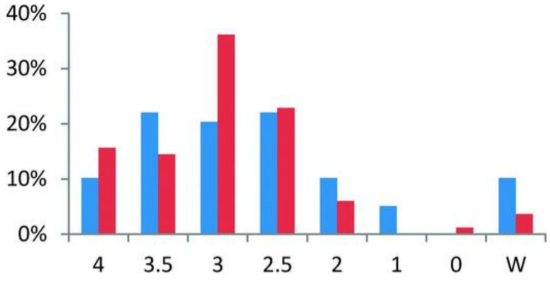

Fig. 2. Simulation for statistics teaching

8 Problems Existing in Practice Teaching of Physical Education Major Under the Guidance of Traditional Disciplines

8.1 The Characteristics of the Training Objectives of Teachers' Education Fail to Highlight

The nature of teacher training is the fundamental characteristic of education major, including physical education major, the focus of physical education talents training is to cultivate practical and applied physical education talents rather than scientific research

talents. As shown in Fig. 3.The objects of physical education talents training are mainly the prospective physical education teachers at all levels and all kinds of schools in the future, especially the middle and small-sized physical education teachers with comprehensive teaching theory literacy and solid Sports skills literacy. One of the important dimensions to measure the quality of physical education professional training is the training quality of physical education normal students' professional practice teaching ability, which directly determines whether the physical education normal students can effectively and qualitatively complete the physical education teaching task after entering the post [20]. The traditional subject oriented physical education personnel training pays more attention to the cultivation of normal students' subject knowledge and subject content knowledge, but lacks the cultivation of normal students' subject teaching knowledge, especially the cultivation of practical teaching ability.

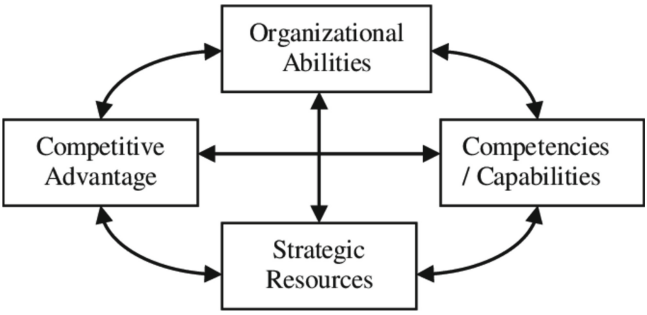

Fig. 3. Traditional sports discipline

8.2 The Construction of Practical Curriculum System Lags Behind the National Education Policy

Curriculum is the core carrier of education. The key to the cultivation of high-quality rest education talents lies in the curriculum system of physical education. As the practical teaching curriculum of the curriculum system of physical education, it is an important part of the curriculum that the rest education normal students must master. In any era, the development and practice of any curriculum need to consider three elements: one is the important basis to be followed. Among them, education embodies the national will, what kind of people to cultivate, how to cultivate, how to evaluate and other educational tasks, must follow the national education reform policy, and must be closely related to the spirit, instructions and requirements into the curriculum system [21]. At present, the practice teaching curriculum construction of physical education curriculum system in most colleges lags behind the national education policy, mainly as follows. In the face of the new era education, such as sports power construction, moral education, curriculum ideological and political education, sports education platform and so on, especially the new policy of physical education and sports education reform, the professional practice of physical education is facing The sensitivity of the curriculum to the spirit of relevant

policies is insufficient, and the integration of the spirit and requirements of the new policy to guide the construction of practice curriculum system is not enough.

8.3 The Richness of Practice Teaching Mode and Teaching Mode Needs to be Strengthened

It can effectively complete the strong support of practice teaching, and the specific performance is as follows. The staff of the practical teaching team is mainly composed of full-time physical education teachers in physical education institutes and departments. It is true that the solid theoretical course teaching and practical course teaching of full-time physical education teachers in physical education institutes and departments can provide guarantee for the physical education normal students to accept the practical course learning. However, in the face of the rapid changes and new forms of physical education in primary and secondary schools, Over reliance on or even only relying on the full-time teachers of physical education institutions to carry out practical curriculum teaching can not fully provide strong support for practical curriculum teaching [22]. Although some colleges have adopted the measures of joint training of physical education talents, They invite excellent PE teachers from primary and secondary schools to participate in the learning guidance of normal students' practical courses, but they are still limited to helping normal students get familiar with the development of PE Teaching in primary and secondary schools or teach them textbooks, teaching methods and other knowledge through excellent PE teachers from the grass-roots level entering the campus to carry out PE teaching lectures in primary and secondary schools [23]. The characteristics of scattered and individual combat are far from forming an institutionalized and large-scale talent joint teaching mode.

9 Conclusions

To sum up, we believe that the significance of teaching reform is very significant. We can not only summarize teaching experience, but also find solutions to problems, and improve the professional level of teachers. We believe that through our efforts, our teaching achievements will be recognized. Introducing SAS into PE teaching is a new way to reform PE teaching. It is of great practical significance to reform education mode and improve teaching efficiency. In the teaching of SAS, computer hardware is the foundation, it is the basic guarantee to realize the supporting function of SAS goal, and the design and development of software is the key to the effective application of SAS in practice, which needs to organize experts to select the subject, design the courseware, and realize the teaching goal According to the teaching objectives and the actual situation of different types of students, the basic program to achieve the objectives is planned to ensure the realization of the task objectives of the courseware.

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