Big Data and Data Mining Application in Autonomous Learning and Badminton Skill Teaching

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Abstract
Data mining technology can help researchers to conduct scientific analysis of data, which can help us to explore the relationship between the various factors from the massive data. Data warehouse and data mining technology as effective information processing and data analysis tools, can make the deep analysis of the data, which promotes the improvement of PE teaching quality and form a healthy sports mode. In this paper, the authors analyse the data mining application in autonomous learning and badminton skill teaching. Also, in badminton technology teaching, the use of autonomous learning teaching mode is conducive to foster the students' subject consciousness, cultivate students to participate in the teaching activities, more conducive to the understanding and knowledge of badminton skill.

Key words: Data Mining, Information processing, Autonomous Learning, Badminton,

1. INTRODUCTION
With the continuous improvement of China's scientific and technological level, the level of physical education in Colleges and universities in China has been fully improved; most of the colleges and universities have a more comprehensive record and statistics of the sports performance and physical data (Sigala, 2015). Faced with a large number of original data, database management and data statistics method has been gradually adapt the country of "health and sports" sports talent echelon construction, the competitive index data cannot establish connections (Jian, 2012; Zhang, 2012). Data mining and data warehouse technology just makes a better reflected, it has double attributes and solve the problems that can carry out the deep analysis of the data (Crespo, 2015), timely and accurate to provide the required information can also help us to find the relationship of various factors from the vast data of deep, find some due to many factors, the dynamic changes of the new guidance of school physical education research and teaching of classroom training (Hu, 2012; Kim, 2014). Therefore, in practice, how to apply the data warehouse and data mining technology for information management and the deep analysis of the students' physical data, is an important subject in current sports scientific research personnel to study, but also better adapt to the inevitable development of modern information science and technology.

Badminton is an item involving various body places of leisure sports in the teaching activities of college sports students especially female college students love, effectively carry out badminton teaching activities can not only enrich students' campus life, but also can cultivate students lifelong sports consciousness shift change in potential, to help students realize the importance of sports the students good sports view formed in the movement of consciousness in a positive and healthy (Dai, 2012; Krstev, 2014). In recent years, with the deepening reform of education system in China, the change of physical education in Colleges and universities turn the world upside down core development, badminton teaching also timely reform of the teaching idea and teaching mode, however, because of the impact of examination oriented education, PE teachers in the teaching reform thinking way have not reached the same standards and goals, therefore facing the new situation, the new development, reform and innovation, in the way of reform of physical education in the US must inject a new strength and wisdom (Huang, 2013). Therefore, in order to effectively improve college students' lifelong physical education consciousness and "health first" education concept, we should open up new teaching ideas and take the road of sustainable development in badminton teaching.

2. DATA MINING TECHNOLOGY
Data warehouse is a subject oriented, integrated, and persistent data set that supports decision making process. The traditional database technology is a single database resources, it is suitable for the operation of transaction processing, but the analytical processing (or information processing) ability is weak. The appearance of data warehouse, the operational and analytical environment were separated, to draw a line between the data processing, analysis of the operational circumstance and in the system the students' physique, function, grade, each semester, the data of physical performance and quality indexes such as data warehouse the theme, form the small size of the data warehouse for a particular topic, namely data mart. In this way, it can be developed from
the original data environment with a single database as the center of the data warehouse as the center of a new system environment.

![Figure 1. Data warehouse](image)

Data mining (Data Mining), also known as knowledge discovery in database (KDD), in short, is from the large, incomplete, fuzzy and random data, in which the extraction of implicit, useful information and knowledge process is a kind of deep level data analysis method. From the perspective of data mining, data warehouse is a platform for the implementation of data mining. Mining technology is a kind of analysis and decision making method, mainly based on the principle of artificial intelligence, machine learning, statistics, data warehouse and data mart in the basis of analyzing and mining historical data, find out the relationship between the patterns hidden in these data, reflect the intrinsic characteristics of the data contained in the data, the information of higher level abstract.

![Figure 2. Data Mining](image)

Data acquisition and processing are the data points in the data source to load the data into the data warehouse. In a data warehouse system, data from the loading process of the data source database to the data warehouse is part of the larger workload, for each one of the data warehouse, the relevant database to conduct a series of data processing, including: (1) data extraction and find the part of the data from the current theme need data from the source database. (2) Data cleaning: data cleaning is the data portal of the entire data warehouse, through data cleaning, data extraction will be cleaned up after the data, to obtain effective data. (3) Data conversion: because each data warehouse in the data is stored according to the front end of the application requirements, so the data cleaning is completed there must be a data processing and conversion process. (4) Pre calculation: in addition to data organization, data warehouse and data source database and an essential difference is, contains a lot of information value in the data warehouse. The calculation of this value-added information is likely to be very complex, the need to use some of the advanced computing and analysis tools. (5) Data aggregation: one of the important applications of data warehouse is the multidimensional query for all data. To carry out multi-dimensional query and analysis, it is necessary to make a summary of all the data according to different dimensions, and keep the results in the data warehouse. (6) Data loading. After data extraction, cleaning, sorting, pre calculation and collection, the results need to be loaded into the data warehouse. This
process should be carried out regularly, and different topics of data loading tasks have their own different implementation schedules.

Figure 3. Data mining model

Mining mode according to the law of the data can be divided into (1) dependent mode: according to the dependence between the data, to find out the correlation between the data. Data association is a kind of important knowledge that can be found in the database. (2) Sequence patterns: given a set of different sequences. Each sequence is ordered by different elements, each of which is composed of different items. (3) Prediction model: according to the time series data from the historical and current data to predict the future data, it can be considered to be the key attribute of time. (4) Classification model: reflecting the common nature of similar things of the characteristics of knowledge and the difference between different things of knowledge. (5) Cluster model: cluster is a set of data in accordance with the similarities and differences into a number of categories. (6) Hierarchical model: the general description of the characteristics of the categories of knowledge. In the practical application of each mode of knowledge discovery, there are a series of mining methods and the corresponding, and most of the mining methods can also dig out several data mining pattern mining methods are commonly used: association rules, decision tree method, neural network method, genetic algorithm, rough set method, covering it cases of rejection method, counterexample fuzzy set method, visual method, signal analysis method, concept tree method.

3. BADMINTON TECHNOLOGY TEACHING MODE

3.1. Badminton technology courses

Over the years, research on the autonomous learning theory has been a hot issue, the teaching theory has been widely applied in the field of network teaching, and the empirical research in the field of physical teaching is even fewer. As a professional sports college students during the school to learn science and technology nearly ten, in addition to their own course, many subjects teaching time is not more than one semester, in the traditional "Teacher centered" and "exam centered" teaching method, students better grasp of a few doors skills are very difficult, a lot of skill to graduation is not to mention to There is not much left., jobs, fresh sports and exploration of independent research, and the social demand for a sports workers far. Based on the above understanding, this paper try to construct autonomous learning teaching model and empirical in badminton skill teaching in order to improve the quality of teaching and development of students' autonomous learning ability.
Figure 4. Badminton technology teaching

- Stimulate learning motivation strategy: At the beginning of teaching, let students head clear learning objectives and evaluation methods, let the students into learning; guide the students in the teaching process through the creation of context; encourage students through competition; actively create a good learning atmosphere to keep students.

- Guide students to experience the strategy: Asked the students in class by watching multimedia and reading textbooks, establish the concept of action; in class, the teacher in the explanation and demonstration, guide students in independent practice to obtain preliminary experience, and then combined with the guidance of teachers to deepen the understanding of knowledge and skills to master; class requires students writing self-evaluation report, active on the class performance summary.

- Personal practice and group exercises: After the teacher has arranged the practice content, the student may freely choose the practice method and the practice form which is suitable for oneself. Such as playing the lofty ball in the learning process, students can choose individual swing practice can also choose two or three people hit better practice.

3.2. Teaching procedure

Taking into account the development of cognitive ability of students, in the absence of diagnostic evaluation of students, the use of absolute fixed teaching procedures is not desirable. According to the guiding role of teachers to organize the classroom on the size, according to the time sequence of teaching activities, the teaching mode of teaching procedures are divided into three stages: actively guide and comprehensive perception stage; accelerate the internalization, consolidate and enhance the flexibility and innovation stage; development. Each stage of the operation of the program is roughly the same, the time span of each stage according to the development of students’ ability to decide. Stimulate students’ interest in learning, guide students to take the initiative to explore the technical action of the experience. Before the class, the teacher arranged for students to read textbooks on the part of the teaching content of the chapters, to provide students with an authoritative badminton teaching. Through a further study, students will understand, grasp the knowledge of action on some confusion, eager to get the teacher’s guidance, the teachers should guide the correct explanation and demonstration seize the opportune moment. In the course of instruction, teachers should instill the knowledge of learning strategies to the students. Then put forward the teaching goal and the corresponding practice method of this class.
Because of the lack of students' cognitive strategies, there are still some difficulties in choosing a reasonable practice method, so the group exercises in this stage are mainly carried out under the unified arrangement of the teachers. But in the process of practice, but also to encourage students to actively explore, communicate with each other, questioned. Such as: students in time of trouble, to the name of the group to ask teachers, to encourage students of mutual assistance between. Choose a form of exercise to evaluate the effectiveness of the practice of students. After the end of this phase, students are required to write a self-Assessment of the stage. In the second stage, appropriate to reduce the role of teachers in the classroom teaching, so that students have more freedom to choose the space to promote the exchange of students.

4. OPTIMIZATION OF BADMINTON TEACHING MODE

4.1. Autonomous learning badminton teaching mode

With the rapid development of modern information technology, college badminton teaching we need to quality education as the guiding ideology, the modern teaching methods is an important measure, to the needs of social development as the basis of teaching, to better address the integration of the system of students' all-round development mechanism, teaching knowledge system reform and meet the needs of social development of the three. As the teaching content based badminton teaching in colleges should always adhere to the "health first" and "Happy Education" and "lifelong sports" the new concept of teaching, so that students in mastering the basic skills and tactics of badminton change at the same time, help students establish good psychological health and self-health evaluation in badminton activities, through scientific and rational and plan to teach, to enable students to grasp the. Therefore, teachers in the actual teaching process, in terms of badminton teaching content should be more substantial, into the fitness and entertainment some badminton sport has its own and leisure, make more harmonious, natural, leisure and entertainment with contemporary college students' fitness needs, lay a solid foundation for the realization of sustainable development of University Badminton teaching.

Through the selection of badminton elective classes of students, the experimental group of 50 people, 50 people in the control group. Before the experiment the subjects were randomly divided into 2 groups, and two groups of students on the shot, hit the body was tested, and high clear back to the lofty ball technology, and the "t" test. The results showed that there was no significant difference between the two groups of students, and the two groups of subjects were from the same population. The results show that the teaching mode of autonomous learning has a significant effect on improving the teaching effect and quality of badminton technology courses. (See Table 1)

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4.2. Mastery of motor skill

To improve the students of new technical skills in the past cognitive theory in teaching badminton, often meet the students in the learning of simple action, still can by imitating the master, when faced with complex technology, will appear. The key lies in the students to grasp the connotation of the technology are not allowed, the composition of the action structure, there is no complete awareness of the matters needing attention. "Research oriented learning" mode is more emphasis on training students on the basis of the understanding of the technical action to engage in practical learning ability.

As in the study of badminton forehand split hanging technology teaching, let students use their spare time to watch the video, access to information, to understand the development and evolution of the badminton ball techniques; in addition, the teacher told the students to preview before class to watch that split hanging technology focuses on the ball, the ball shooting angle, force direction, waving the racket trajectory the flight of the ball, the ball direction, and other key links. Let the students with questions to learn, and through classroom questioning or interactive way eventually let students understand the reasons and working principle structure of split hanging technology used now in badminton matches, to deepen the cognition of the technology. In the investigation on students before class by watching the video and related professional books will help improve your understanding of new technology and skills "very helpful", 42 students fill in the“ very helpful ”, accounting for 57% of the total number of students; 23 students think that" help ", accounting for 43%. This also shows that the students through a period of time before the class preview, and gradually realized the theoretical guidance for the effective acquisition of skills play an important role.

Figure 6. Badminton sport skill

4.3. Enhance the interest in learning

In the process of teaching practice, students with the early accumulation, the quality of the shot was significantly improved, to experience the joy of success. And this strong interest is not only reflected in the classroom, but also to take to practice after class. For example, in the actual teaching of badminton courses, teachers encourage students to actively participate actively in many aspects, such as the concentration of technical action principle discussion, the preparatory activities, game creation, technology demonstration lecture and grouping guidance etc.. Every student has an opportunity to show themselves in front of the group. Although there will be a demonstration to explain the phenomenon is not accurate, at this time the teacher to give timely encouragement and support, classroom atmosphere and therefore become active. For the original special basis is relatively weak students, encourage their efforts in the preparatory activities, creating games, better show themselves in front of the students.

The different technology level of the students into a group, there are more sources of learning for students with no previous basis; secondly, teachers create a learning environment for the students, between students communicate with each other, increase the chance of error correction; again, for the class to participate in demonstration of students, will urge the class more carefully prepared, but for me, had no foundation of students through the preview, deepened the understanding and mastery of sports technology. In skill learning, for example, focus on discussion and group learning is a frequently used method.
5. CONCLUSIONS

In badminton technology teaching, the use of autonomous learning teaching mode is conducive to the transformation of the traditional teacher centered injection teaching mode. To foster the students' subject consciousness, play the main role, to improve students' thinking ability, cultivating innovation consciousness and innovation ability, to cultivate students to participate in the teaching activities, more conducive to the understanding and knowledge of badminton skill. In the rapid expansion of the current information society, education is inseparable with the information, education is the essence of the transfer, acceptance and processing of information, physical education in Colleges and universities are also unfavorable. Data warehouse and data mining technology as effective information processing and data analysis tools, can make the deep analysis of the data, which promotes the improvement of PE teaching quality and form a healthy sports mode of people will play a certain guiding significance.

REFERENCES