Application of Decision Tree Algorithm in Teaching Quality Analysis of Physical Education

Chengliang Zhang(✉) and Hui Yang

Qujing Medical College, Qujing 655000, Yunnan, China
1605857401@qq.com

Abstract. Learning situation analysis is not only the basic link of teaching activities, but also one of the basic ways to improve effective teaching. However, only on the premise of ensuring the effectiveness of learning situation analysis can we improve the effectiveness of teaching. Compared with other teaching, physical education teaching has more urgent needs and stricter requirements for learning situation analysis. Therefore, this paper uses data analysis technology to elaborate what teachers should pay attention to and how to do when doing learning situation analysis of physical education teaching from the current situation of learning situation analysis of physical education teaching, the mode of learning situation analysis of physical education teaching and the method of learning situation analysis of physical education teaching, In order to provide theoretical guidance for physical education teaching practice.

Keywords: Sports · Data analysis technology · Teaching · Academic situation analysis

1 Introduction

At this stage, there is a gap between theory and practice in academic situation analysis. At present, the analysis of learning situation in China is mostly the product of teachers' "taking it for granted", which is the result of teachers' conjecture about students' learning situation according to their experience rather than scientific analysis. On the one hand, teachers have preliminarily understood that learning situation analysis is the basis and premise of teaching design. On the other hand, teachers may not apply learning situation analysis to actual teaching, or the value of learning situation analysis can not be brought into play due to improper application. Its specific performance is as follows: (1) teachers have not applied physical situation analysis to teaching. At this time, learning situation analysis is only a formalism. Teachers do not bring it into daily teaching. Learning situation analysis, which is just "talking on paper", must not play a common role, resulting in the separation between learning situation analysis and actual teaching

M. A. Jan and F. Khan (Eds.): BigIoT-EDU 2022, LNICST 465, pp. 236–242, 2023.
https://doi.org/10.1007/978-3-031-23950-2_26

activities. (2) Teachers' understanding of learning situation analysis is not deep. Teachers' understanding of learning situation analysis determines the role of learning situation analysis. If teachers lack a deep understanding of learning situation analysis, they can not apply learning situation analysis to teaching design, and naturally can not fully play the role of learning situation analysis. (3) The way of learning situation analysis is too single. Teachers themselves have carried out learning situation analysis, but most of them have the color of empiricism. It is teachers' subjective conjecture on a single dimension of learning situation through many years of teaching experience without scientific basis [1]. At this time, learning situation analysis can not help teachers improve teaching quality, but will increase teachers' workload and see no good teaching effect. Even if teachers know the importance of learning situation analysis, they are unable to change the embarrassing situation that learning situation analysis has become a "chicken rib".

2 Big Data Analysis Technology

2.1 The Role of Big Data Analysis and Mining Technology and Decision-Making

In data mining, we extract valuable data in a large amount of data in the shortest time, and apply the information technology to industry development. Most of them are large data analysis drilling techniques, and the concrete industry combines algorithms in the data analysis process. Combining genetic algorithms in the biosphere helps ensure data mining speed, accuracy and integrity. During the course of data mining, we continue to analyze large data in the process of digging data under high data backgrounds, combining high performance computing, machine learning, artificial intelligence, model recognition, statistics, data visualization, database technology and expert systems, and It is possible to form a complete system, to put emphasis on optimization, and to make the measures more accurate. You can understand the demand well. Currently, each industry uses data mining as the main data analysis method. Technology such as classification, optimization, identification and prediction in data mining plays an important role in many industries.

With the development and application of large data technology, there are major changes in the various fields of society such as finance, medical care, telecommunications, education, and so on, there are large amounts of data every day, social uncertainty factors, and the processing of data types become more complicated. After applying computer technology, there are still significant limitations on traditional processing methods and problem solving. Now, data mining technology effectively resolves large data problems and becomes the "king of data". Data drilling technology also faces great opportunities and challenges. The application of data mining algorithm greatly improves data analysis ability and can effectively deal with actual problems [2].

2.2 Big Data Analysis and Application Status

Big data analysis and application platform mainly includes five key processing steps: selecting platform operating system, building Hadoop cluster, data integration and preprocessing, data storage, data mining and analysis, which further improves the efficiency of big data application.

(1) Select the platform operating system. In the process of big data analysis and processing, it faces many data resources. In order to improve the organization and management efficiency of these data resources, it is necessary to use the matching operating system to realize the priority access and hot data storage of big data as much as possible, manage the physical storage space of big data, and realize the scheduling and allocation of resources. Common operating systems include Red-Hat. CentOS or Debian, which can be used as the operating tools of the underlying platform, have strong scalability and can support data processing. The platform operating system can also realize the virtualization function according to the, so as to expand the physical storage space of the system, share CPU and improve the utilization of communication bandwidth.
(2) Build Hadoop cluster. Hadoop is a software platform that can run big data processing software. The core technology is MapReduce, which can form a cluster of a large number of computers to realize massive data distributed computing. Hadoop has attracted many commercial companies to develop and design, and has built various open source components, including sqoop, HBase. And spark. Hadoop includes many constituent elements. The lowest constituent element is Hadoop Di distributed file system (HDFS), which can maintain all storage node files in the Hadoop cluster platform. The upper layer of HDFS is a MapReduce engine, which includes two constituent components, jobtrackers and tasktrackers. Hadoop can be used to realize data processing and operation, Further meet the distributed data operation.
(3) Data integration and preprocessing. There are many resources for big data integration, such as file logs, relational data, object data, etc. These have both structural and non structural data. Therefore, preprocessing is required when integrating the data together, so that the service bus can be used for communication transmission and improve the consistency and reliability of the data. Data preprocessing can use tools such as impala. Sparksql and hivesql.
(4) Data mining and analysis. There are many resources for big data storage. These resources are usually disordered and messy. Although certain organization principles are adopted, people's use of data is also very complex. Therefore, the introduction of data mining and analysis function can improve the timeliness of data utilization and shorten the data processing time. Artificial intelligence technology is introduced into data mining and analysis, such as BP neural network, Bayesian algorithm, support vector machine and K-means algorithm. The data mining process is shown in Fig. 1.

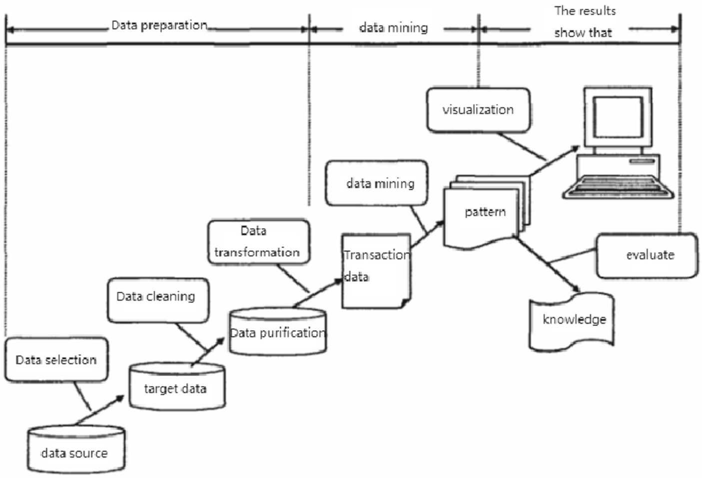

Fig. 1. Data mining process

3 Analysis of Learning Situation in Physical Education Teaching

3.1 Necessity of Situation Analysis in Physical Education Teaching

Physical education is a special course. It is an organized, purposeful and conscious social activity with physical exercise as the basic means and the purpose of improving health and physique. Physical education has two levels: first, physical exercise, the body needs to bear a certain exercise load, which is essentially different from other disciplines; Second, physical education includes the relevant theories of physical education and basic health care knowledge supporting its practical activities. While physical exercise, we also need to learn and master relevant theories. It can be seen that physical education is a complex subject, and there are more uncertain factors in the teaching process [3]. Therefore, its demand for learning situation analysis is more urgent and strict.

3.2 Types of Emotional Analysis in Physical Education Teaching

Learning situation analysis provides the basis for teaching content, teaching design and later teaching evaluation, and needs to be related to subsequent teaching activities. According to the different objects of learning situation analysis, it can be divided into two types: the analysis of students' situation and the analysis of students' learning situation. The former has a larger scope than the latter and is generally used for learning situation analysis in the semester or academic year. The latter has a smaller scope and mainly refers to the factors directly related to the learning process, including learning starting point, learning state and learning results. According to the different time periods of learning situation analysis, it can be divided into learning situation analysis before the semester or academic year, learning situation analysis of a unit and learning situation analysis of a class/a knowledge point. The learning situation analysis of the semester or academic year is the basis for teachers to select teaching contents. To a certain extent, it determines the contents that students need to learn in this learning period, which should be carried out before the teaching objectives and textbook analysis of this learning period, while the learning situation analysis of a unit, a class or a knowledge point should be arranged after the textbook analysis and combined with the conclusion of textbook analysis, It is mainly used as a reference for the selection of teaching methods.

3.3 Mode of Situation Analysis in Physical Education Teaching

Physical education teaching design has its systematicness. Physical education teaching design starts from the overall function of physical education teaching system. In terms of working procedures, it is often not to complete one step first and then start the next step, but constantly complement each other, and fully consider all factors to produce the overall effect and achieve the most optimization of physical education teaching effect. Therefore, physical education teaching design is a whole, which needs to be designed closely around the established objectives, so as to achieve the consistency of objectives, process and evaluation. When analyzing students' learning situation, the whole process of teaching should be regarded as a whole, and the analysis of learning situation should run through the whole process. Therefore, some teachers analyze the learning situation of the whole teaching process through the model before, during and after class, so as to ensure the effectiveness of teaching.

Pre class learning situation analysis is a problem that teachers should first consider and can not avoid in learning situation analysis. It mainly includes students' learning starting point and pre class preparation. The starting point of students' learning is the degree of students' pre mastery of the learning content of the course, including the degree of cognition of the course content, the basis of mastering the skills and the attitude towards the learning of the course. The pre class preparation state is aimed at what kind of preparation the students have made for the course, what their learning motivation is and the development degree of their own cognitive level. The analysis of learning starting point is directly related to the teaching content, and students' pre class preparation affects teachers' choice of teaching materials and methods [4].

The analysis mode before, during and after class is also the concrete embodiment of teaching evaluation. Teachers design the evaluation scheme before class, implement the evaluation scheme in the teaching process, evaluate the results after class, analyze and report the evaluation results, and finally deal with the evaluation results. For the teaching design of daily class, teachers can directly modify and adjust the teaching scheme according to the analysis of evaluation results, so as to serve the next teaching. Therefore, it can be considered that the three analysis dimensions before, during and after class are interrelated and interdependent to form a whole, and none of them is indispensable. The relationship between pre class, in class and after class analysis modes can be shown in Fig. 2.

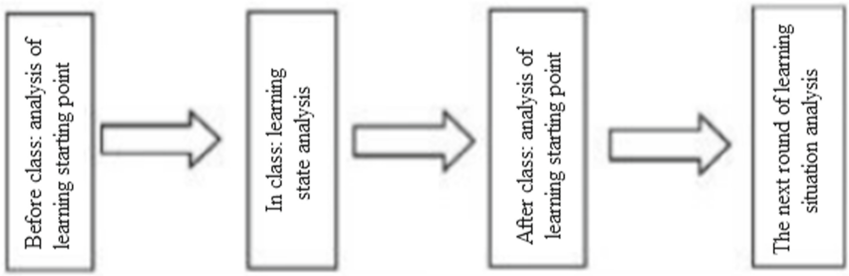

Fig. 2. Relationship diagram of learning situation analysis model

4 Methods of Learning Situation Analysis

After selecting the object and determining the analysis content, we will start the investigation. Common survey methods include observation, conversation and interview, questionnaire survey, etc. Combined with relevant literature, this paper briefly discusses how to carry out learning situation analysis in physical education teaching.

(1) Observation method. This is the most direct and simple method, especially physical education. It is a course that pays attention to practical application ability. Only through direct observation can we accurately grasp students' learning and other situations. Teachers can observe the analysis object in class or students' extracurricular activities.
(2) Interview method. Conversation is a direct and positive contact with the analysis object to ask about the subject's learning experience. The interview was conducted from the human hand side of the contact people around the analysis subject. Both methods have their limitations. The conversation method will be affected by the age and cognitive level of the interviewees, especially the junior students, who can not make an objective and accurate judgment on themselves. The selected objects are usually other teachers or their parents, and they can only make a general description, especially parents, whose description may be more personal subjective thoughts.
(3) Questionnaire survey method. Most of them are used to investigate students' sports theoretical knowledge or their interests, generally for senior students. The problem with the questionnaire survey is that some students may not be able to describe the theoretical principle of a sports skill in words, but they can show this skill. On the contrary, some students can understand the principle, but they can't master this skill in classroom practice. Therefore, the survey method should not adopt a single one, but multiple combination, mutual supplement and comprehensive analysis.
(4) Establish students' Sports portfolio, that is, material analysis. Portfolio evaluation is no longer a new thing in the field of education. This method can also be used in physical education teaching to establish students' Sports portfolio for analysis. Some researchers suggest that students should complete their own sports portfolio and design their own personalized portfolio cover with sports color. Students' sports performance evaluation form, photos of students' sports activities, award-winning certificates of various sports, teachers' words, their own sports perception, collected

sports materials, etc. can be put in the archive bag. All sports related materials can be put in the room. Using these materials, teachers can have a more comprehensive understanding of students. When analyzing the learning situation, these are powerful empirical materials, and the teaching design can be targeted.

5 Conclusion

Learning situation analysis is the analysis of students' situation. Learning situation analysis is for students' learning. Learning situation analysis in physical education can be carried out from the aspects of knowledge and skills, process and methods, emotion and so on. The object of analysis can be all or sampling. Every class in the teaching process should be analyzed to grasp the situation of students, improve the effectiveness of teaching activities and promote the development of students.

References

1. Ying, C.: Using effective learning situation analysis to improve work efficiency. China Educ. Technol. Equip. **4**, 59–62 (2011)
2. Peifen, Z., Songjie, Q.: Let learning situation analysis run through the whole process of teaching. Sports Teach. Friends **1**, 4–5 (2011)
3. Zhangfa, Y.: How to do well in learning situation analysis. Guizhou Educ. **16**, 26–27 (2010)
4. Haiping, Z.: Learning situation analysis, how to get out of the practical dilemma. Phys. Educ. **2**, 22–24 (2008)