Utilizing Data Mining Techniques for Enhancing Physical Education Teaching Quality: A Sports Science Perspective

Congjiang Wang[1]*

Abstract

Quality physical education (PE) instruction plays a pivotal role in the development of talent and the overall success of educational institutions. Recent scholarly investigations have unveiled significant challenges within the realm of PE teaching. Consequently, it becomes imperative to establish a comprehensive PE teaching quality evaluation system that leverages data mining techniques. This study endeavors to design a robust model for evaluating PE teaching quality based on association rules mining. The process begins by defining evaluation indices specific to PE teaching quality. Subsequently, a meticulous analysis of the influencing factors affecting PE teaching quality is conducted. The results generated by the model presented herein closely align with established standard values, demonstrating superior evaluation quality. This model, rooted in data mining techniques, offers a promising reference point for future assessments and improvements in the domain of physical education teaching quality. In conclusion, the fusion of data mining methodologies within the sports science perspective provides a compelling framework for enhancing the quality of physical education teaching. This approach not only addresses existing challenges but also paves the way for more effective talent development and the advancement of educational institutions.

Keywords: Association Rule Mining; Physical Education; Teaching Quality; Evaluation Model

1. Introduction

Education is an important link between national prosperity and social progress (Gong et al., 2021; Hortigüela-Alcalá et al., 2020). Higher education is an important channel to send talents to the society, and it has trained all kinds of high-quality talents for the society. Currently, the world's fight for complete national strength is mostly expressed in the amount and quality of talents, which is eventually reflected in the struggle for education. Physical education in schools is not only an essential method of achieving the goal and job of physical education in our nation, but it is also the basis for creating mass physical education (García-Fariña et al., 2021; Jáuregui et al., 2020). Physical education is an essential aspect of higher education in colleges and universities. It is the culmination of a person's systematic physical education as well as the most important stage of social physical education. The National Students' Physique and Health Survey, issued by the General Administration of Sport in 2010, found that college students' physical condition is poor and on the decrease (Descoeudres & Hagin, 2020a; Tomayko et al., 2020).(Descoeudres & Hagin, 2020b; Tomayko et al., 2020)

To this end, the state departments concerned have formulated some relevant policies to promote students to participate in more physical exercise, improve physical fitness. Government work to a certain extent reversed the decline in physical health of young people, but under the new situation, physical health of young people is still facing severe challenges. But it enhances the sports teaching quality and solves the young people physique health decline question the important means. Research on how to improve the quality of physical education has been a very important subject (Bao & Yu, 2021; Lee et al., 2020), but in recent years there are few studies on the factors affecting the quality of physical education. This study is based on the previous studies. This paper probes into the concept of PE teaching quality, and analyzes the influencing factors of PE

[1]Civil Aviation Flight University of China, Logistics Service Corporation, Guanghan, Sichuan, 618307, China

* Correspondence: Congjiang Wang, Email: wangcongjiang@cafuc.edu.cn

teaching quality in colleges and universities by combining qualitative and quantitative methods. Hope to further improve the quality of physical education related theory and improve the quality of physical education intervention measures for the development and implementation of reference and basis. With the emergence of the problem of the decline in the physical fitness of our teenagers (Killian et al., 2020; Ribeiro et al., 2010), the quality of physical education has undoubtedly become the object of most concern. This study can help school administrators and teachers better understand the influencing factors of P. E. teaching quality in colleges and universities, and guide teachers and school administrators to implement P. E. teaching in advanced teaching strategies and effective ways, in order to effectively improve P. E. teaching quality (Liu et al., 2019; Tilga et al., 2020).

The factors affecting the quality of physical education mainly include five aspects: students, policy, teachers, school management and social influence. From the perspective of human factors, teachers and students (Alcaraz-Muñoz et al., 2020), followed by the teaching process is mainly the selection and arrangement of teaching content, sports teaching methods and methods of design and application. From the perspective of teaching input, it is mainly sports facilities, sports teaching management and sports teaching environment and so on (Çiçek et al., 2019a, 2019b). These two studies comprehensively summarized the main factors affecting the quality of physical education, but the determined factors are a little more extensive, separated from the most direct factors affecting the classroom itself, such as school management, social impact and policy are not the most direct factors. From the teacher and student, syllabus, teaching methods, teaching environment to analyze its impact on the quality of physical education, mainly from the level of teaching analysis (Suresh et al., 2022; Vedantham et al., 2022). From the point of view of human being, it mainly refers to teachers and students, while from the point of view of material, it mainly refers to the things related to physical education teaching, involving specific hardware facilities, and from the point of view of engaging in the factors, it mainly refers to the things closely related to physical education classroom teaching, such as the writing of physical education teaching plans, the arrangement of physical education teaching tasks, the flexible use of physical education classroom teaching evaluation and the evasion of teaching safety risks. The factors determined in this study are comprehensive, and closely related to the classroom itself, but the analysis of each level is relatively simple, and there are still a broad range of problems (Talaghir et al., 2020).

2. Design of PE Teaching Quality Evaluation Model Based on Association Rules Mining

2.1 Defining the Quality of Physical Education

Quality was first proposed by the American scholar Sellai Xun, mainly used to improve the "World War II" after Japan's domestic communications products. Since then, the concept of quality has been interpreted differently in different fields (C, 2017). There are four interpretations of quality in the Dictionary of Chinese Language: One is quality and quantity (Kyriakides et al., 2020). The other is the level of good or bad things, products or work. Other dictionaries, such as Cihai and Modern Chinese Dictionary, explain the quality just like the generalization above (Williams & Pill, 2021). When the term "quality" is used specifically in the humanities and social sciences, the concept of "quality of work", "quality of life" and "quality of education" are not defined logically.

Mass is a basic, complicated, and ambiguous idea. It's simple since it's just the good, bad, or good, or bad of a thing; but, it's tough because it's the good, bad, or good of satisfying specific standards, and determining whether they're scientific is difficult. Its fuzziness is mostly represented in, which correlates to various satisfaction criteria (Richards et al., 2021; Vo et al., 2022). As a result, in the study of the P. E. teaching quality assessment system, various researchers have varied understandings of the connotation of teaching quality, making it impossible to create a uniform standard. The quality connotation is thoroughly examined throughout the evolution process from conformance quality to applicability quality to customer satisfaction quality. The term "conformance quality" refers to when a product's quality is simply needed to fulfil the standards of a standard. On the other hand,

"applicability quality" must be judged in terms of how well it fulfils customers' demands, and product quality is largely determined by how well customers satisfy their wants. Again to "customer satisfaction quality" that: because the customer satisfaction "standard" is subjective, it in addition to the applicability requirements, there may be implicit requirements in which. The concept of "quality" in teaching management is divided into relative quality and absolute quality. The concept of relative mass is the result of a comparison that can be measured according to a certain standard or requirement (Weimer, 2013). The concept of quality is changing and evolving, not invariably; it will vary according to time, place, and subject, and will be updated and enriched with the development of society and technology. To sum up, the concept of quality originates from a reflection of the quality of a product in the production process. But no matter from what angle to define the quality can not leave the meaning of the word itself, that is, a reflection of the degree of things (Davide et al., 2021).

Therefore, the definition of quality in this paper is: quality is a reflection of whether something has reached a certain degree or requirement. Teaching is an organic system composed of many elements. The elements in this system interact with each other to form a whole. Teaching system is a special kind of system, which is mainly embodied in its stable and clear elements, and these elements themselves are also a complex subsystem with a variety of changes. Based on this, the concept of PE teaching system is defined as: "PE teaching system is an organic complex of special professional PE teachers, students, PE curriculum conditions and other elements." However, there is no unified view on what are the basic elements of the teaching system. Among them, there are six representative theories: the theory of three elements, the theory of seven elements, the theory of six elements, the theory of five elements, the theory of four elements and the theory of three elements. These seven elements of teaching activities that a more comprehensive summary of the relevant elements. The seven main elements are: teachers, students, teaching objectives, curriculum, teaching methods, teaching environment and feedback. According to these seven elements, we can know a more comprehensive physical education teaching system.

To begin with, no matter how you define teaching, instructional activities are inextricably linked to the teacher's "teaching." Teachers are an important part of the teaching process, and teaching is distinct from the general learning activities of the key. It can be demonstrated from long-term teaching experience that teaching has the qualities of a high-speed conduit for students to learn about the world when they are guided by instructors. As a result, physical education instructors are critical components of the physical education curriculum. Second, the essential portion of instructional activities, according to the teaching idea, is students' "learning." As a result, students are an important part of the physical education teaching system. Furthermore, the teaching aim serves as the foundation for all instructional activities. According to the notion of P. E. teaching quality, students' objective accomplishment must be embodied by the P. E. teaching quality. As a result, one of the most important aspects of the teaching system is the teaching aim. However, the curriculum is a significant component in the instructional activity.

Curriculum content has a direct effect on the teaching process, which is embodied in that it restricts the choice of teaching methods, means and organizational forms, and it is also the basis of teaching activities. In addition, any teaching activity needs to carry on under certain space-time condition. This certain space-time condition then refers to the tangible and the intangible teaching environment. Teaching environment is a basic factor of teaching activities. With the rapid development of social productivity and science and technology, its influence on teaching activities is becoming increasingly prominent. Finally, teaching is an interactive activity between teachers and students for information transmission. From the point of view of system theory, teaching process is a subsystem of physical education teaching system. It is also a hierarchical process, in which a student's educational experience is a teaching process from the beginning to the end of a course, a chapter or a unit of a course is a teaching process, and a course is a teaching process from the beginning to the end. Different researchers in the history of the development of teaching theory have different division of teaching process. There are six levels in the process of physical education: the first level is the process of physical education beyond the

school section. It refers to the whole process of PE teaching from the beginning of primary school to the graduation of university, and the second level is the process of learning PE teaching. The third level, the school year of sports teaching process, relates to the present Chinese education system, which is separated into primary, junior high, high school, university, and other sports teaching processes. The phrase "physical education teaching procedure" is the fourth level. The content, requirements, and duties of the PE teaching process are allocated to each teaching week of two semesters based on the characteristics of instructors, venues, teaching materials, environment, the type of teaching materials, and other variables. The unit physical education teaching procedure is at the fifth level. It is the method through which instructors organize certain units, allocate class hours, and carry out instruction according to the semester's physical education teaching process plan. It refers to the instructor who, in accordance with the unit physical education teaching process, implements the physical education teaching process in each class.. Macroscopically speaking, P. E. teaching system refers to the extra-school and extra-school P. E. teaching, which is directly influenced by national educational will, politics, economic development and productivity. The medium level sports teaching system refers to the school year sports teaching, it refers to according to the school sports teaching situation and the student's characteristic, assigns the study section sports teaching standard and the plan content, the duty, the request and so on concrete to school year, causes it to link up mutually, and puts into practice the process, generally by all levels each kind of school sports department control.

Micro-level physical education teaching system mainly refers to the semester, unit, class hours of physical education, generally controlled by all types of school physical education teachers. No matter from any level to talk about physical education ultimately need to implement specific units and hours of teaching, it has a direct impact on the quality of physical education. According to this, the concept of P. E. teaching quality is also multi-layered. From the macro level, it mainly refers to the P. E. teaching effect reflected by the students' P. E. teaching activities. The quality of PE teaching at the middle level mainly refers to the effect of PE teaching reflected by students after their PE teaching activities in the school year. From the micro-level refers to the students after the semester, unit of sports teaching activities reflected by the effect of sports teaching. This paper is mainly based on the microcosmic level of P. E. teaching quality, hoping that the result of the research is more universal and can provide reference for teaching practice. Broadly speaking, it refers to the combination or unification of teaching and learning. Educators include, but are not limited to, teachers. Learners include students, and there are a variety of relevant learners. The narrow sense of teaching is specifically refers to the school teaching and learning activities of unity. Therefore, PE teaching is not only limited to school PE in a broad sense, but also includes competitive sports and social PE teaching. This article is mainly to study the narrow sense of physical education: in school education, students in a purposeful, planned, organized under the guidance of teachers, to achieve the goal of development of education.

According to research on the notion of physical education teaching quality, the term has many meanings, one of which is the full reflection of physical education teaching impact. Physical education, according to their views, is a process, and the quality of physical education is a reflection of the process's outcomes. We can see from the examination of the PE teaching system that it is a multi-faceted and multi-level complicated system that includes numerous aspects.The quality of PE teaching is the result of the interaction of many teaching factors. The quality of PE teaching is closely related to many factors in PE teaching activities. According to the viewpoint of system theory, all systems are an organized whole composed of various elements and their coordinated ways of action with the external environment. Without an integral relation, there is no integral function.

2.2 Designing the Monitoring and Evaluation System of Teaching Quality

As an important part of monitoring organization, the monitoring team is the operator of monitoring work. The working attitude, working ability, knowledge level, personality character and motive of the monitoring personnel in the educational monitoring practice directly affect the monitoring effect. Monitoring personnel have played an important role in promoting the lawful

administration of local governments at all levels, attaching importance to basic education, implementing nine-year compulsory education, eliminating illiteracy among young and middle-aged people, fully implementing the educational policy and comprehensively improving the quality of education. In particular, a number of comrades who have been engaged in basic education work for a long time have made positive contributions to the monitoring of education in our country by exploiting their profound professional foundation, rich work experience and high policy level in education monitoring posts.

With the development of education, the reform and development of secondary and lower education, and the transformation of administrative functions of educational administrative institutions, some problems existing in the education monitoring team can not meet the needs of the development of the education monitoring work. This is mainly reflected in the fact that there are still a few places where there are no monitoring institutions and personnel engaged in educational monitoring. In places where monitoring agencies have been set up, there are also monitoring personnel older, difficult to complete the heavy task of monitoring and other situations. In some places the selection of monitors is not strict enough. In the existing full-time monitoring, more than half of them have not received on-the- job training, and the quality of monitoring needs to be improved urgently. In view of the above problems, schools should take appropriate measures to improve the monitoring team and improve the quality of school monitoring. Establishing and perfecting the supervision system is the premise guarantee of effective teaching quality supervision. Teaching supervision system is an educational system which is used to supervise, inspect and guide the teaching and teaching management of schools, to ensure the realization of teaching quality, to improve the quality of personnel training and teaching management, and to promote the continuous development of education and teaching reform of colleges and universities.

The status and composition of the teaching supervision and direction group must be clearly stated; the duties and daily work of the teaching supervision and direction group must be clearly stated; the method of supervision by the teaching supervision and direction group must be adopted; and the problems must be discovered through daily teaching inspections such as examining lectures, attending lectures, and so on. To guarantee that stringent quality control and execution of instruction are followed. The monitoring of teaching quality is not only for a certain type of people to monitor, it is a school full participation in the quality management activities, including the majority of teachers and students, managers and teaching assistants, their enthusiasm will be conducive to the operation of the teaching quality monitoring system.

2.3 Analyzing the Influencing Factors of Physical Education Quality Model

There are many factors affecting the quality of physical education in colleges and universities from macro to micro. From the macroscopic aspect, the factors that affect the quality of P. E. teaching in colleges and universities involve a wide range of aspects, including social factors such as the guidelines and policies of relevant government departments, relevant laws and regulations, public opinion guidance and market values. In addition, also includes the school factor, such as school's teaching thought, teaching funds, teaching infrastructure, teaching management, training system and so on. Therefore, it is very difficult to make clear the relationship between the factors, and it is difficult to grasp the key factors if too many factors are analyzed.

In addition, from the feasibility of data acquisition and their own ability and other aspects of consideration, this paper mainly observes the micro-analysis of factors affecting the quality of physical education. It mainly refers to the specific factors that affect physical education teaching activities, such as teaching methods, teaching environment, teachers, students, and so on. PE teaching is an important way to improve PE teaching quality. Theoretical analysis based on this level can be more specifically applied to PE teaching. Teachers are initiators of PE teaching activities. And in the teaching activity, the teacher has the leading role, this kind of leading role display level then depends on teacher's teaching ability as well as the accomplishment. Teachers are one of the essential factors in analyzing the factors that affect the quality of physical education in colleges and universities. The influence of teachers on the quality of physical education is embodied in those aspects, and there is no unified conclusion, different scholars in the analysis of different

priorities. Teachers' teaching attitude is a key factor that affects students' learning. Teachers need to maintain a positive attitude throughout the teaching process. If the teacher has a negative teaching attitude, the corresponding classroom atmosphere will be more boring and not lively enough, so cannot arouse the resonance of students. Students will also be discouraged from participating in the classroom, thus hindering their acceptance of knowledge and making it difficult for them to develop healthily. On the contrary, if teachers have a positive teaching attitude, they will prepare to enrich the P. E. class as much as possible before class, and at the same time, they will be full of energy and enthusiasm. Students are the main body of P. E. learning and have the initiative in the process of P. E. learning, which directly affects the quality of P. E. teaching. Therefore, the student is the influence sports teaching quality essential another main factor.

Poor student organisation, a lack of hardworking spirit, a lack of attention to physical education instruction, and a lack of passion are all factors that have an impact on teaching quality. There are a variety of elements that might influence students' learning activities throughout the teaching process, including both internal and external ones. Teaching techniques, teaching atmosphere, and so on are examples of external variables. Internal aspects primarily concern pupils' learning aptitude, desire in learning, and motivation. Student factors are defined as: students' particular performance on the quality of physical education in instructional activities. It mostly consists of a student's study interest and motivation, as well as his or her study aptitude. The 4 latent variables in this paper are teaching environment, teacher factor, teaching method and student factor, but the latent variables cannot be measured directly and need to be explained by the corresponding observation variables. There are five main observation variables of teacher factors: teaching attitude, language ability, ability of observing and understanding students, ability of organizing, managing and adjusting teaching activities, and ability of action demonstration. The teaching method is mainly reflected by 5 indexes, and 5 indexes measure the teaching method from macroscopical to microcosmic. Teaching methods from the macroscopic point of view mainly refers to the big teaching strategy, mainly refers to the teachers in the teaching design, fully considering the effective combination of teaching methods. The second aspect mainly refers to the specific teaching methods used in class, mainly focusing on the diversity of teaching methods to mobilize the enthusiasm of students. The third aspect is from the micro level to understand teaching methods mainly refers to the teaching means, including the use of teaching aids, effectively improve the learning effect. The factors of students are mainly reflected by 4 indexes, the first is the difference of students' sports foundation, the second is the difference of students' learning methods, the third and the fourth are students' learning interest and motivation.

2.4 Constructing PE Teaching Quality Evaluation Model Based on Association Rules Mining

Association rules mining finds interesting association or correlation among items in a large number of data. Therefore, in this paper, we can use Association rules mining algorithm to estimate the quality of PE teaching model. At this time, the accuracy of model evaluation, the calculation formula of effect index and evaluation coefficient are as follows (1) ~ (3).

$$Pr = \frac{TP}{(TP+FP)} \quad (1)$$

$$Re = \frac{TP}{(TP+FN)} \quad (2)$$

$$F = \frac{2\times Pr\times Re}{(Pr+Re)} \quad (3)$$

In formulas (1), (2) and (2), Pr represents the accuracy, Re represents the performance indicator, F represents the evaluation coefficient, and TP represents the estimated value, At the initial stage of quality assessment, the physical education teaching characteristics need to be calculated. The calculation formula is as follows: (4), cluster of sample characteristics is conducted, and the clustering formula is as follows: (5).

$$D = \sqrt{\frac{C_1 S}{IQ}} \quad (4)$$

$$F = \sum_{I}^{C_1} TQ\sqrt{D^2} \quad (5)$$

In formulas (4) and (5), C_1 represents the data points, S represents the characteristic variance, I represents the teaching effect data, T represents the relational value, and Q represents the difference of the function of the algorithm. At this time, the rating index does not meet the design standards of the model, and a new cluster

calculation is needed. The calculation formula is as follows (6) and (7), and the quality evaluation model (8) can be obtained.

$$P = D\sqrt{TQ} \quad (6)$$

$$W1 = \sum_T^I C_1 B \quad (7)$$

$$E = \left(\frac{2LT+SD)}{TQ}\right)^2 \quad (8)$$

Using the quality evaluation model designed above, we can evaluate the quality of physical education accurately and increase the accuracy of evaluation.

3. Experiment

In order to verify the evaluation effect of the PE teaching quality evaluation model based on association rules, this paper compares it with the traditional PE teaching quality evaluation model.

3.1 Experimental Preparation

The purpose of the pre-survey is to choose the major indicators, assess reliability and validity, and give a solid reference for the official survey. Exploratory factor analysis was used to check the reasonableness of the indicators after collecting a small sample of data. Pre-test, via the sorting of the original data, the basic information is presented in Table 1 for A University, B University, C University, D University, E University, F University, G University, H College, I Institute of Technology.

Table 1

Basic Information Statistics

Schools	Quantity	Reliability
A	47	Good
B	6	Good
C	6	Good
D	6	Good
E	14	Good
F	5	Good
G	8	Good
H	5	Good
I	7	Good

Based on the data in Table 1 for descriptive statistical analysis, the main purpose of descriptive statistics is to understand the basic characteristics of the data and to see whether the data conform to the normal distribution, you can draw the teaching environment measurement model diagram, as shown in Figure 1.

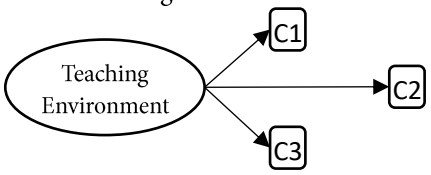

Fig. 1 Measurement model of teaching environment

As you can see from Figure 1, you can look at the centrality and dispersion of a set of data through a few simple statistics. Generally, the center position of data is judged by the maximum, minimum and average value, while the standard deviation, kurtosis and skewness are used to judge the dispersion of a group of data. This article uses SPSS25.0 to process the data, and the results are shown in Table 2.

Table 2

Data results

Item of question	Maximum statistics	Mean value statistics
C1	5	2.43
C2	5	1.81
C3	5	2.26
C4	5	1.59
C5	5	1.92
C6	5	1.70
C7	5	1.81
C8	5	1.80
C9	5	2.61
C10	5	2.87

The standard deviation of most measurement variables is less than 1, as shown in Table 2, indicating that the data is generally concentrated. Two skewness and kurtosis coefficients are used to determine if a set of data fits the positive too distribution. When the absolute value of skewness is less than 3 and the kurtosis is less than 8 hours, the data resemble a positive too distribution. As illustrated in Figure 2, you can now plot a model for assessing instructor variables.

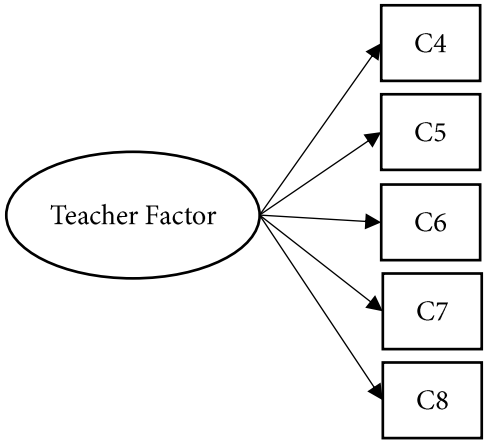

Figure 2 Teacher assignment model

In order to make the factor variables more explanatory, the maximum variance method is used to perform the orthogonal rotation. After 5 iterations, the result is shown in Table 3.

Table 3

Results of rotation

Item of question	Element 1	Element 2
C1	.866	.151
C2	.786	.275
C3	.763	.282
C4	.678	.299
C5	.341	.443
C6	.364	.457
C7	.436	.839
C8	.089	.762
C9	.326	.762
C10	.058	.610

As can be seen from Table 3, the three common factors extracted by exploratory factor analysis method are slightly different from the dimensions previously set by literature, and can reflect the dimensions previously set, but still need further adjustment. Common Factor 1 fits in with the teacher dimension. The main influencing factors are teaching attitude, language expression ability, action demonstration ability, ability to observe and understand students and ability to control teaching activities. The measurement correction diagram is shown in Figure 3.

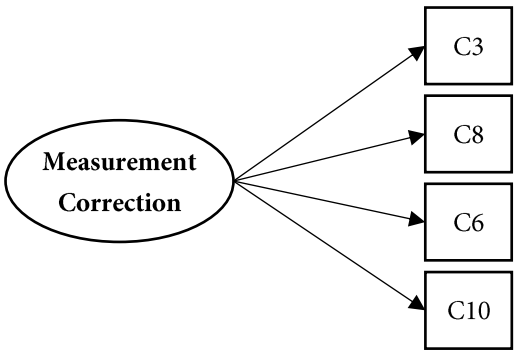

Fig. 3 Diagram of measurement correction

According to the revised chart in Fig. 3, it is not reasonable in theory to put the teacher-student relationship into the teacher factor, because the establishment of good teacher-student relationship needs the joint efforts of teachers and students, so it cannot be used as an indicator to measure the teacher factor alone. Common Factor 2 fits into the dimension of teaching methods, and a model of student factor measurement can be obtained, as shown in Figure 4.

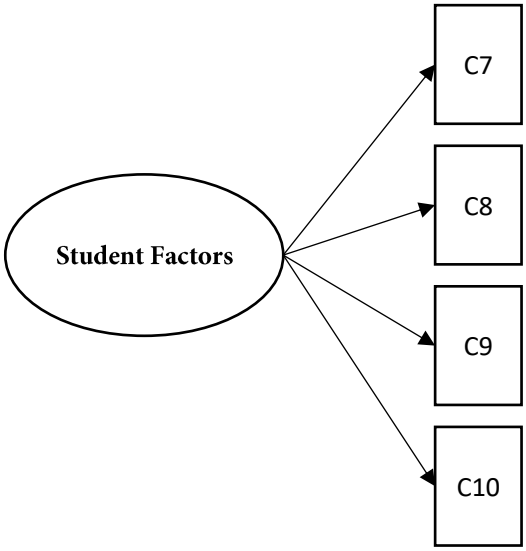

Fig. 4 Model diagram of student factor measurement

The student factor measuring model, as shown in Figure 4, primarily assesses the rationality of PE teaching strategy design, variety of teaching techniques, heuristic, and scientific. However, including field equipment into the teaching process is not feasible. Field equipment is important not only for the teacher's instruction, but also for the students' learning. Learning motivation, learning interest, disparities in sports foundation, and learning techniques are the primary components in "public factor 3," which is consistent with the previous one. It is appropriate to generalise student relationships to this dimension, but a thorough examination of student relationships requires instructors to make adjustments. So this article does not put it into the dimension of student factor. Although the measurement index of PE teaching environment is summed up to other dimensions in the factor analysis, the PE teaching environment restricts the teaching process to some extent. Therefore, this article retains the former for the influence sports teaching quality core essential factor dimension division.

3.2 Experimental results and discussion

The results show that the above experimental samples meet the quality evaluation requirements of PE teaching model, and can be evaluated at this time. The evaluation results of the two models are compared with the standard values. The experimental results are shown in Table 4.

Table 4

Experimental results

Quality evaluation times	Standard evaluation value	The evaluation value of the teaching quality evaluation model designed in this paper	Evaluation Value of Traditional Teaching Quality Evaluation Model
1	1	0.994	0.746
2	1	0.999	0.654
3	1	0.954	0.739
4	1	0.941	0.715
5	1	0.937	0.443
6	1	0.946	0.658
7	1	0.967	0.701
8	1	0.997	0.735
9	1	0.999	0.634
10	1	0.936	0.319

From the table 4, it can be seen that the quality evaluation result of the model designed in this paper is closer to the standard value, which proves that the model designed in this paper has better evaluation quality and can be used as a reference for the follow-up evaluation of physical education teaching quality.

4. Conclusion

According to the model of influencing factors of the PE teaching quality, we can see that the quality of teaching environment has a direct impact on the quality of teachers and students. In order to improve the quality of physical education, we must first create a good teaching environment. This requires school administrators and teachers to participate. As far as school administrators are concerned, they should have an overall view. Plan and adjust all aspects of the teaching environment as a whole and make it an organic whole. For example, it is not only necessary to meet the teaching needs, but also to meet the needs of teachers and students to carry out extracurricular sports activities. At the same time, we also need to create a good atmosphere of sports culture to stimulate students' enthusiasm for learning. PE teachers should consider the flexibility of teaching methods, whether the methods can adapt to the students' learning characteristics, whether the diversity of methods can arouse the students' enthusiasm, whether the scientific methods can effectively solve the key points and difficulties of sports technical movements so that the students can master technical movements quickly, and whether the heuristic methods can guide students to learn technical movements and cultivate students' interest in learning.

The third microcosmic level teaching method is the concrete teaching method and tool. In the process of teaching, teachers can effectively use teaching aids to reduce students' learning difficulties, increase students' learning confidence and improve students' learning effectiveness. In addition, we should strengthen innovation, reveal the common elements of all methods and the characteristics of each method through analysis and comparison, so as to establish an effective method-type strategy system. In the whole process of PE teaching, the individual difference between students exists objectively. PE teachers should attach great importance to this problem, teach students in accordance with their aptitude and treat them differently, so as to improve students' learning effect by effective teaching methods. Student's individual difference not only manifests in the physical ability and the movement skill aspect, but also manifests in aspects and so on sports ability as well as individuality psychology. Attaching importance to the individual difference of these psychological characteristics and its teaching is helpful to arouse students' interest in study, arouse students' enthusiasm for study, improve students' P. E. This will require physical education teachers in the teaching process to correct teaching attitude, teaching work full of enthusiasm, so as to inspire students to learn interest. In peacetime teaching process not to use a fixed, stiff practice content, to often change the practice content and form. Simultaneously must be good at using the appraisal, arouses the student study enthusiasm.

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