



# Effect Analysis of Physical Education Course Based on Artificial Intelligence

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**Abstract.** The traditional physical education curriculum teaching stage effect is unable to make the analysis comprehensively to the curriculum each stage factor, therefore proposes based on the artificial intelligence sports curriculum teaching stage effect analysis. Through the collection of PE course teaching stage effect data, judge each stage effect entity relation, calculate each stage effect analysis credibility, complete the teaching stage effect measurement. Simulation experiments are designed to compare the effectiveness of the analysis method based on artificial intelligence and the traditional analysis method in the teaching stage of physical education.

**Keywords:** Artificial intelligence · Physical education · Teaching · Effect analysis

## 1 Introduction

The evaluation of physical education is an important part of physical education, which is the feedback to the evaluation of the quality of physical education and the effect of physical education, and plays a positive and important role in improving the quality of physical education [1]. At present, the evaluation of students is mainly based on the judgment of the development and changes of students' morality, intelligence and physique, and the process of giving guidance to the development of students' morality, intelligence and physique. And the reasonable and correct evaluation of students is not only the main problem faced by the effect evaluation of the course teaching stage, but also the problem that must be solved by the effect evaluation of the course teaching stage [2]. Therefore, this paper puts forward the effect analysis of physical education teaching stage based on artificial intelligence and constructs the evaluation method of artificial intelligence.

At present, the evaluation index method of physical education has become the baton of physical education. The actual teaching content of the physical education department is mainly determined by the indexes in the evaluation method, that is, the teaching content depends on the indexes. And the greater the weight of sports evaluation index is, the higher the degree of attention will be. Scientific and reasonable evaluation index

method of physical education quality can adjust teaching behavior, so as to obtain better evaluation results [3]. In this way, the scientific and reasonable evaluation index method will guide the teaching of track and field teachers and students' learning gradually to the scientific standardization, in the objective will inevitably promote the improvement of the teaching quality of physical education curriculum. The theory of artificial intelligence is consistent with the general direction of cultivating innovative consciousness and spirit in physical education in China. Literature [4] has built a smart sports classroom based on "wechat public platform" and wearable devices applied to heart rate monitoring. The main research conclusion: the intelligent teaching mode includes three parts: pre class "prophet", in class "perception" and after class "exploration". It realizes three functions: pre class multimedia micro course electronic textbook preview, in class interactive teaching and after class micro course sports guidance. It aims to improve the teaching efficiency and quality of physical education classroom, and scientifically evaluate the achievement effect of physical education classroom goal, to realize the real integration of physical education in and out of class. Literature [5] studies the practice of college physical education curriculum reform. The results show that the effective strategies and key links of curriculum construction and management of community activities are to include community activities in physical education scores and credits; The establishment of extracurricular sports activity guidance center, the construction of scientific system and standard system, the implementation of community tutor system and the construction of evaluation index and system of sports community provide organization, system, technology and incentive guarantee for the effective implementation of community activity curricular. The implementation of community activity curricular in cultivating students' Sports interest, improving sports skills, forming exercise habits and promoting The comprehensive ability has obvious effect. However, due to the nature of extracurricular teaching and overall teaching, the application of the above methods is not applicable to the teaching of physical education, and the research on the specific application of artificial intelligence in physical education is blank, therefore, the method of evaluating the effect of artificial intelligence in the teaching stage of physical education has certain guiding significance.

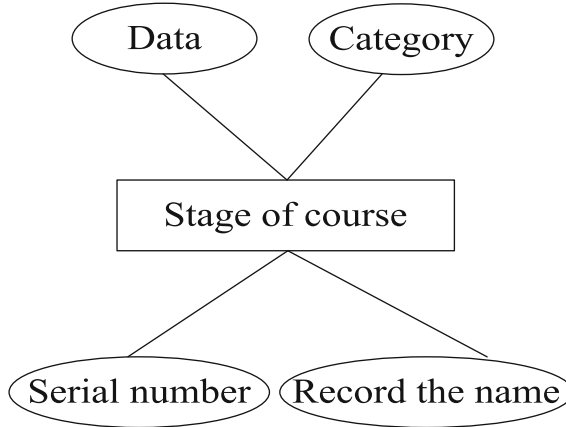
## **2 Effect Analysis of Physical Education Teaching Stage of Artificial Intelligence**

### **2.1 Data Collection of the Effect of the Teaching Stage**

The advantage of the method of effect analysis in the teaching stage of physical education course of artificial intelligence lies in its strong background data support. Therefore, in the method design, especially in the information management method, the design of data collection is very important and needs to be carefully processed and realized [5]. In the teaching stage effect evaluation method, involves many kinds of data operation processing.

The data collection of the effect analysis method in this teaching stage includes many entities, such as user entity, student entity, user category entity, indicator detail entity, evaluation form entity and so on [6].

For the effect of teaching stage, it mainly refers to the user objects that need service in this method [7]. The numbering attribute is used to indicate the effect of different teaching stages, and is the primary key of the whole column. Other attributes in the method are listed in Fig. 1:



**Fig. 1.** Attributes of teaching stage

Since this method is mainly used to evaluate the effect of teaching stage and involves a large number of operations related to the effect data of teaching stage, the effect of teaching stage is designed separately to provide the efficiency of the method. Among them, the primary key that distinguishes the effect data of different teaching stages is the number [8].

Course categories are used to classify different course categories and to label users with different identities. The primary key of the entity is the numbering attribute.

Indicator detail entity the indicator detail entity is used to store each evaluation indicator and related information in the method, where the primary key is the indicator number.

The evaluation table entities are numbered for the primary key of the evaluation table, and other attributes are listed in the figure below (Fig. 2).

The relation between entities mainly indicates the relation between different entities in this method. In the method of effect analysis in the teaching stage, there is a many-to-many relationship between users and evaluation forms. There are multiple users, and evaluation of different students can generate multiple evaluation forms. There is a many-to-many relationship between students and archives. Each student has his own archives. There is also a many-to-many relationship between the user and the student files. Different users can view the file information of multiple students. Similar relationships exist between other entities. The relationship between entities of the effect analysis method in the teaching stage is shown in Fig. 3.

Each table in the data collection is designed to reflect the interrelationship between the tables in the entire data collection. This paper mainly describes the administrator

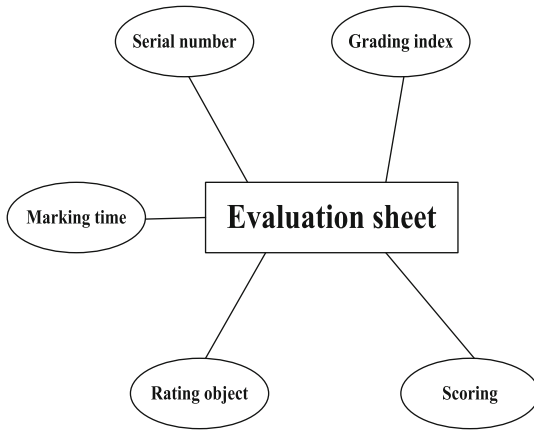


Fig. 2. Evaluation represents intent

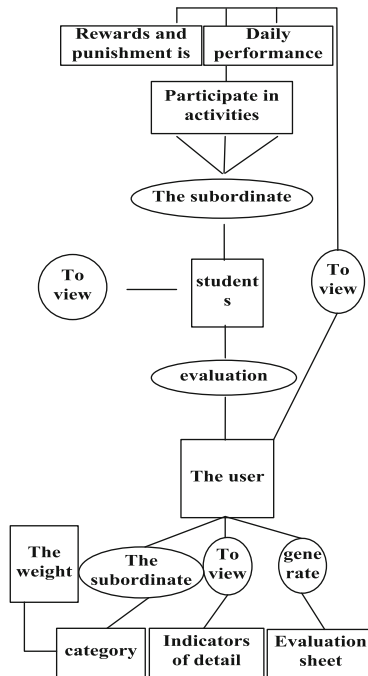


Fig. 3. Effect analysis of entity relation in teaching stage

table, user table, student table, indicator list, evaluation table and weight table of the teaching stage effect analysis method in detail.

The administrator has the authority to manage and modify the entire method, so its information must be stored in the entire method. When the administrator logs in the method, the login information will be compared with the administrator information

stored in the background of the method. Only after it is completely correct can it enter the evaluation method and conduct corresponding operations. The specific information is shown in Table 1:

**Table 1.** Course management data

The field names	Meaning	Can the field type be null	Can the field type be null
Id	Management number	Int	A primary key
Name	The login name	Varchar	Null
Password	Password	Varchar	Null
Endtime	Last login time	Datetime	Null

The course information sheet mainly stores the information of the course, which is used for the comparison and management of the user's identity information. The content of the course information sheet is as follows (Table 2):

**Table 2.** Information table of course stage

The field names	Meaning	Can the field type be null	Can the field type be null
u_id	Serial number	Int	主键
L_name	Login name	Varchar	Null
L_pwd	Password	Varchar	Null
u_name	The name	Varchar	Null
t_id	Category	Int	Null
startDate	Time	Dateime	Null
endDate	Last session time	Dateime	Null
CardNum	Identity number	Varchar	Null
Birthday	The date of	Varchar	Null
Mobeilphone	Number	Int	Null

Student tables are used to store and represent information about students and themselves in methods. As for the operation of the student table, it can directly affect the records of the students, and then affect the assessment of students' academic performance and the authority in the method, so it needs to be carefully designed. The list of students is as follows (Table 3):

**Table 3.** Learning information of students in the course stage

The field name means whether the field type can be null	The field name means whether the field type can be null	The field name means whether the field type can be null	The field name means whether the field type can be null
stu_id	Serial number	Int	A primary key
stu_num	Student id	Varchar	Null
stu_pwd	The name	Varchar	Null
sex	gender	Int	Null
professional	professional	Varchar	Null
class	The class	Varchar	Null
grade	grade	Varchar	Null
department	Is don't	Varchar	Null

The evaluation form mainly stores the contents and information of the corresponding evaluation questionnaire (Table 4).

**Table 4.** Evaluation form

The field names	Meaning	Can the field type be null	Can the field type be null
G_id	Serial number	Int	A primary key
a_id	Index class number	Varchar	Null
G_u_id	Rating object	Varchar	Null
Gd_u_id	Rated object	Int	Null
G_Date	Marking time	Varchar	Null

## 2.2 Calculate the Effect Credibility of the Teaching Stage

Reliability refers to the reliability of the results, which is used to reflect the size of the random error in education measurement. The higher the reliability index, the more reliable the test results. The test with high reliability can provide teachers with reliable information, and indicate that teachers' evaluation of students is objective and reliable, and also makes students' understanding of themselves highly consistent with the actual situation, thus contributing to the improvement of teaching and learning methods.

There are many methods to calculate reliability, such as retest reliability, homogeneity reliability and grader reliability. The most commonly used of these is the homogeneity reliability, also known as the internal consistency coefficient, which refers to the degree to which an exam measures the same content. The calculation methods of reliability

include halving method, coulomb method, and kolkstedt formula, etc. This method USES kolkstedt formula to find the reliability, see formula (1):

$$R = \alpha \frac{k}{k-1} \left( 1 - \frac{\sum_{i=1}^n S_i^2}{s^2} \right) \quad (1)$$

Where,  $R$  is the reliability of an evaluation, and  $\alpha$  is the evaluation reliability coefficient;  $k$  is the total number of course stages;  $s_i^2$  is the score variance of each evaluation object;  $s^2$  is the variance of the total score.

The value of the reliability coefficient  $\alpha$  ranges from 0 to 1. The closer to 1, the more real the score. The evaluation criteria for the value of reliability coefficient are shown in Table 5:

**Table 5.** Reliability coefficient value criteria

Reliability coefficient	Evaluation standard
0 ~ 0.6	Low credibility
0.6 ~ 0.8	Moderate credibility
0.8 ~ 1	High reliability

From formula (1), it can be seen that increasing the number of exam questions, controlling the difficulty of the questions between 0.4 and 0.7, taking various means to improve the differentiation of the test questions, and making the grading standards as objectively as possible can improve the effect reliability of the grading stage of the course [9].

### 2.3 Effect Measurement and Analysis in the Teaching Stage

In general, the effect measurement in the teaching stage of a course is to induce certain reactions of students through examinations or tests, and then to evaluate these reactions through quantitative or qualitative descriptions, which are the results of the effect measurement in the teaching stage of a course [10].

Classical Test Theory (CTT) was developed from the early 20th century to the 1950s. It is an operational statistical analysis method for questions and tests. The theoretical basis of classical test theory is true fraction theory. The so-called true score, that is, the expected value of the real score of the test, is expressed by (2):

$$T = E(X) \quad (2)$$

Where,  $X$  is the real score in the test, is the mathematical expectation,  $E$  is the real score. Due to the existence of measurement error, the true score  $T$  cannot be measured directly. The measured score is the actual score obtained in a test, which includes two parts: effective score and measurement error. The measurement error is composed of

method error and random error. Therefore, the relationship between the measured score ( $X$ ), effective score ( $V$ ), random error ( $E$ ) and method error ( $I$ ) can be expressed as follows:

$$X = V + E + I \quad (3)$$

In formula (3), the effective fraction  $V$  and the method error  $I$  usually appear stably. We call the sum of the two as the true fraction, from which formula (4) can be obtained:

$$T = V + I \quad (4)$$

Random error  $E$  is caused by accidental factors, individual and the size of the random error of plus or minus no obvious regularity, thus causing the observed score will fluctuate within a certain scope, but on the whole consistent with the statistical law, therefore, the classical measurement theory is through the method of measurement by some accidental factors, the process of estimate of the true score is obtained.

Reliability and validity are used as two indexes to measure the overall quality of the test paper, and difficulty and differentiation are used as two local indexes to measure the quality of the test paper. The analysis of test scores is also divided into question analysis, unit analysis and overall analysis.

### 3 Simulation Experiment

#### 3.1 Experimental Preparation

In order to verify the effectiveness of the method of physical education teaching stage effect analysis based on artificial intelligence, a simulation experiment is designed. Under the same experimental conditions, the traditional artificial physical education teaching stage effect analysis method is compared with the artificial intelligence-based physical education teaching stage effect analysis method.

In the process of experiment, the traditional artificial physical education teaching stage effect analysis method adopts the method of artificial analysis, through the method of artificial statistics and data analysis, the teaching effect of each stage course is analyzed.

In the physical education curriculum teaching stage effect of artificial intelligence analysis method, the browser server architecture is adopted, with the help of a browser to access can be realized access to relevant methods, B/S structure is mainly using the Web browser technology, and integrated with a variety of scripting languages, such as JavaScript, VBScript, Perl Python, PHP, etc., as well as the ActiveX technology, achieve strong functional requirements, and don't have to be like the original complex special-purpose software must be used, which greatly saves development costs. The B/S method architecture can meet the requirements of simplifying terminal node load, saving cost and ensuring the flexibility of the method.

Computer: Windows 2000/XP/2003, installed IE6.0 or above, installed Windows MediaPlayer 10.0, installed sound card, and equipped with speakers or headphones.  
Administrator client: Windows 2000/XP/2003, installation method management client,



install Office 2003, install Windows Media Player 10.0, install sound card, and equipped with speakers or headphones.

Web Server: Windows 2003 Server operation method.

Collect data Server: Windows 2003 Server operation method, install SQL Server 2008 to collect data.

Web and data collection server hardware: 2 Xeon MP E7320 processors, 8 GB DDRII memory, 584 GB SAS disk and gigabit Ethernet card.

Network environment: Intranet on campus.

Method to open the Internet Information Services (IIS, Internet Information Services), in Windows Server 2003 is the default is not installed IIS 6, need to install another. After installing IIS 6, you also need to turn on support for ASP. It is used to support the operation of the effect analysis method of physical education teaching stage based on artificial intelligence.

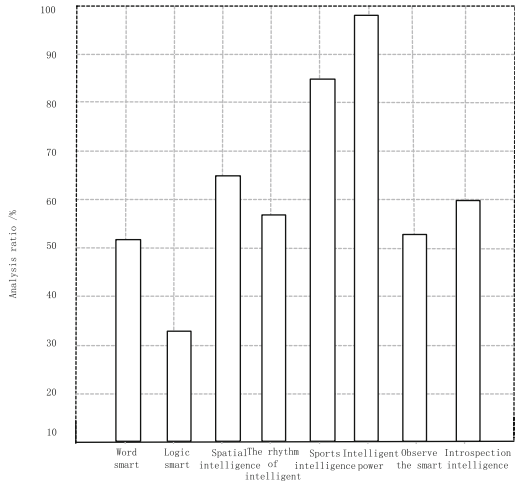
In the process of the experiment, two methods were used to analyze the same experimental object, and the experimental data were analyzed on the data of physical education courses of each grade in a certain school. The data analysis of the course stage is divided into three categories, namely, the theoretical knowledge of physical education, the practical courses of physical education and the application of process assessment. The course stages are divided into different categories according to the course categories, including (1) pre-class preparation; (2) group activities; (3) exhibition of works; (4) self-evaluation; (5) mutual evaluation; (6) teacher evaluation; (7) feedback and improvement. The results of the two methods were compared.

### 3.2 Analysis of Experimental Results

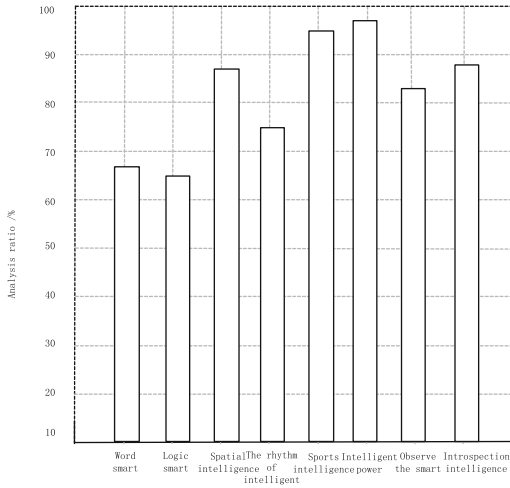
In the experiment, the effects of the two groups of methods were analyzed, as shown in Fig. 4:

The traditional analysis method of the effect of artificial physical education teaching stage, when analyzing the effect of the same object in the course stage, is difficult to evaluate objectively, and the judgment will change with the differences of the collective. The traditional analysis method adopts manual data analysis, which is difficult, time-consuming, heavy workload and subjective error. There is a lack of quantitative analysis, so there are fewer analysis and evaluation indexes in the test results, and the analysis degree is shallow, the lowest analysis result is only 30%.

Comparatively speaking, the artificial intelligence method of the effect analysis in the stage of physical education teaching determines a standard beyond the set of evaluation objects, and compares the evaluation object with the objective standard, so as to make an objective judgment on the evaluation object. Because this method selects multiple fields as the benchmark in the evaluation object set, and then compares each evaluation object with the benchmark, the evaluation result is not limited by the overall level. Comparing the past and present of the evaluated person, or comparing several aspects of the evaluated person, can better reflect individual differences. The viewpoint of presupposition evaluation is divided into several items and evaluated separately. According to certain evaluation objectives and requirements, the situation of the evaluation object is described in detail, and an appropriate evaluation is made, which can describe the objective facts in detail, with high reliability.



(a) traditional manual analysis methods



(b) artificial intelligence analysis method

Fig. 4. Comparison of analysis effects between two groups of methods

After the analysis, it can be seen that the artificial intelligence method can better analyze the effect of the teaching stage of the physical education course and clarify the future development direction of the course.

#### 4 Conclusion

The beginning of the application of the effect analysis of artificial intelligence in the teaching stage of physical education is not the end of the research. Meanwhile, there

are certain deficiencies and defects in other aspects, which will be left for further improvement in the follow-up research.

With a rational view of today's educational dynamics, it can be predicted that the future education will achieve two integration, namely, the integration of education concept and artificial intelligence theory, and the integration of technical means and information technology. It is believed that with the gradual deepening of the teaching practice research guided by the artificial intelligence theory, it will inject new vitality into China's education reform and produce positive and far-reaching influence. Although computer assisted instruction already common in China, but in theory, and technology development compared with developed countries still have many unsatisfactory place, courseware how the more reasonable and more fully integrated together with the process of chemistry teaching, how to merge with all kinds of audio-visual media more naturally, and above all kinds of the frontier problems of the application of information technology in the field of teaching, will be the general education workers in the future work to learn, explore and practice direction. Teachers should set up modern educational concepts, accelerate the pace of research on the integration of information technology, artificial intelligence theory and curriculum, so that students can fully develop artificial intelligence, so that each student can succeed in their own fields of advantage.

Looking back in the century, what we are doing is to find out the successes and shortcomings in every step we have taken in the past, so as to provide direction and guidance for the future development. What we hope is that more schools can integrate artificial intelligence teaching and courseware technology into the quality education and information teaching reform of schools, so that more children can benefit from it.

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