Research on Online Teaching Method of Children's Sports Enlightenment from the Perspective of Artificial Intelligence

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Abstract. Considering the problems of poor playing fluency of teaching video and low interest of students in the online teaching of children's sports enlightenment by traditional methods, this paper puts forward the research on the online teaching method of children's sports enlightenment from the perspective of artificial intelligence. From the perspective of artificial intelligence, the teaching information collected by the online teaching information collection module of infant sports enlightenment is uploaded to the computer. According to the basic requirements of infant sports learning module, the online teaching environment of infant sports enlightenment is built. By establishing the online teaching resource data set of infant sports enlightenment, Decompose and reconstruct the processed online teaching resource data set of infant sports enlightenment, mine the online teaching resources of infant sports enlightenment, design the online teaching process of infant sports Enlightenment on the basis of establishing the online teaching quality evaluation mechanism of infant sports enlightenment, and realize the online teaching of infant sports enlightenment. The experimental results show that the online teaching method of early childhood physical education enlightenment from the perspective of artificial intelligence can not only enhance the teaching video playback fluency, up to 93.4%, but also improve students' interest, up to 70%.

Keywords: Artificial intelligence · Early childhood sports · Online teaching · Teaching environment · Resource mining · Quality evaluation

1 Introduction

With the rapid development of human society today, with the intelligent popularization of network information technology, children's time to participate in sports activities is occupied by the network, which has brought many negative effects on children's physical and mental health. Increasing sports activities and increasing the proportion of children's physical education teaching in the early childhood stage plays a positive role in promoting the development and improvement of children's physical and mental strength. Physical education in early childhood should be based on stimulating interest, pay attention to the interest, comprehensiveness and diversity of physical education in

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early childhood, effectively integrate popular and ethnic elements, reform and innovate the teaching mode of physical education in early childhood, so as to achieve the teaching purpose of improving children's physical quality and taking care of children's mental health. Under the background of healthy China, the concept of paying attention to the development of early childhood health education has increasingly appeared in relevant national policies, which has stimulated researchers from all walks of life to explore the development of early childhood health education. The development of early childhood health education has also been paid attention to by the development of modern society, and various diversified early childhood health education concepts have been put forward. In recent years, the concept of survival education has been put forward. Swimming, as a sport, is called "necessary survival skills and necessary life skills", which also promotes the rapid development of the implementation of swimming among young groups in China. With the age of the group learning swimming gradually turning to the younger age, there is a corresponding demand for the teaching methods, means and forms of infant swimming in the society.

In domestic research, Chai Guangxin et al. [1] in order to effectively promote the cultivation of students' Wushu core literacy, in view of a series of problems in China's Wushu teaching, such as "complex and difficult" routine content, single teaching method, emphasizing "form" rather than "strike", emphasizing knowledge indoctrination, neglecting the cultivation of autonomy, emphasizing teachers' "teaching", neglecting students' "learning" and "students don't like Wushu classes", This paper puts forward the principle of effectively promoting Wushu cognition, Wushu sports ability and Wushu personality cultivation. Based on this principle, this paper makes a specific exploratory design for the strategies of "turning difficulties into easy", "turning shallow into deep", "turning boring into fun", "turning technology into practice" and "knowing new and old", and expounds the specific implementation methods of the above strategies, Provide practical guidance for Wushu Teaching Reform in primary and secondary schools. Gao Xiang et al. [2] practiced the elements of scientific exploration through group experiments and formed the understanding that the change of pressure is negatively correlated with the change of volume under quantitative and constant temperature. Digital inquiry is a process of comprehensively using "graphical method" and "analytical method", making graphics through point drawing method - establishing mathematical model - looking for corresponding empirical formula - solving equation corresponding coefficient - from functional equation to image - forming cognition. Only through data exploration can the cognition of "isothermal change of gas" be full of empirical research meaning. Considering the characteristics of NNA and tlbo, Zhang y et al. [3] proposed an effective hybrid method tlnna for solving engineering optimization problems based on tlbo and NNA. The performance of tlnna on 30 famous unconstrained benchmark functions and 4 challenging engineering optimization problems is tested, and the optimization results are compared with other competitive meta heuristics. The comparison results show that tlnna not only has good NNA global search ability, but also has fast tlbo convergence speed. It is more successful for most test problems in terms of solution quality and computational efficiency.

In recent years, the research on online teaching of infant sports Enlightenment has been increasing, but the research on the design of online teaching method of infant sports

enlightenment from the perspective of artificial intelligence is less involved. Using appropriate teaching methods for children's sports enlightenment teaching can not only better implement the artificial intelligence technology, but also stimulate students' learning interest and improve the effect of children's sports enlightenment teaching. Therefore, for the teachers of physical education at the grass-roots level, under the background of the implementation of artificial intelligence, especially the teachers engaged in grass-roots teaching, they need to deeply understand the teaching methods of infant physical education enlightenment, and improve the teaching methods in combination with the teaching practice. All these reflect the urgency and importance of the research on the design of teaching methods for children's physical education enlightenment.

Teaching method is the basic element of teaching activities. In children's sports enlightenment teaching activities, how to complete the teaching objectives and achieve the corresponding teaching tasks needs to be achieved through appropriate teaching methods. It is very important for physical education teaching to correctly understand, select and innovate children's physical education enlightenment teaching methods. Effective physical education teaching activities need not only the positive interaction between teachers and students, but also the rational use of physical education teaching methods. Therefore, we must always pay attention to the design of children's sports enlightenment teaching methods, and pay attention to the existence and value of children's sports enlightenment teaching methods. There is no "universal" teaching method in children's sports enlightenment teaching, but we should constantly change the teaching method according to the specific situation. Teachers should be good at using teaching methods, adapting and processing teaching methods to meet the needs of teaching. Choosing appropriate teaching methods is by no means simple. We should not only reserve knowledge and skills, but also accumulate teaching practice. PE teachers can innovate and choose some teaching methods suitable for themselves. The method itself has no advantages or disadvantages, only whether it is appropriate or not.

For children's sports enlightenment teaching, reasonable teaching methods can better achieve teaching objectives and complete teaching tasks. Therefore, the majority of physical education teachers need to fully understand the characteristics and functions of each teaching method, absorb advanced physical education teaching methods on the basis of the commonly used physical education teaching methods, and better improve the teaching effect through the effective combination and application of physical education teaching methods. Based on the above research background, this paper designs an online teaching method of children's sports enlightenment from the perspective of artificial intelligence, under the horizon of artificial intelligence, the children's enlightenment teaching were collected information collection module, online teaching information uploaded to the computer, according to the basic requirements of children's learning module, set the children's enlightenment online teaching environment, through the establishment of children's enlightenment online teaching resources data sets, decomposition of reconstruction after the children's enlightenment online teaching resources data set, excavate the online teaching resources of early childhood sports enlightenment, and on the basis of establishing the online teaching quality evaluation mechanism of early childhood sports enlightenment, design the online teaching process of early childhood sports enlightenment, realize the online teaching of early childhood

sports enlightenment, and improve the online teaching effect of early childhood sports enlightenment.

2 Design of Online Teaching Method for Children's Sports Enlightenment

In horizon, artificial intelligence, according to the basic requirements of children's learning module, set the children's enlightenment online teaching environment, digging out the children's enlightenment online teaching resources, to build up children's enlightenment online teaching quality evaluation mechanism as the foundation, analysis of online teaching process, realize the online children's enlightenment teaching method research.

2.1 Build an Online Teaching Environment for Children's Sports Enlightenment

The principle of building the online teaching environment of infant sports enlightenment is mainly to upload the teaching information collected by the online teaching information collection module of infant sports enlightenment to the computer from the perspective of artificial intelligence, and then use the machine learning algorithm to construct the machine learning grid diagram of infant sports enlightenment online teaching resources. According to the basic requirements of infant sports learning module, Combined with the artificial intelligence technology of children's sports enlightenment online teaching [4], build a three-dimensional model of machine learning network. Expressed by function as follows:

$$\zeta_i = \frac{\Delta p \cdot \gamma}{s} = \frac{\gamma W_i - s}{s} \tag{1}$$

In formula (1), ζ_i represents the teaching resource information data of the online teaching environment of infant sports enlightenment, Δp represents the teaching resource information data in the online teaching database of infant sports enlightenment, the relationship between ζ_i and Δp is positive and negative, and γ is the ratio between the real-time data of infant sports enlightenment online teaching and the data in the database, W_i represents the virtual model of online teaching of infant sports Enlightenment Drawn by i sub model.

According to the requirements of children's sports enlightenment online teaching, adjust the parameters in the three-dimensional model of machine learning network, and obtain the virtual model of children's sports enlightenment online teaching under different parameters, so as to meet the actual needs of children's sports enlightenment online teaching. Let the pixels of the three-dimensional model of machine learning network be x_i and y_i respectively, and the total pixels of the three-dimensional model are $z = x_i y_i$. Adjust the pixel resolution of the machine learning network environment. The expression is as follows:

$$\begin{cases} f_1 = l_1 \cos \theta tn \cdot z \\ f_2 = l_2 \cos \theta tn \cdot z \end{cases} \tag{2}$$

In the formula, the model pixels in the positive and negative directions of the three-dimensional model of the machine learning network for children's sports enlightenment online teaching are f_1 and f_2 respectively, the three-dimensional model lengths in the positive and negative directions are l_1 and l_2 respectively, θ represents the contrast of the children's sports enlightenment online teaching environment, t is the time length of adjusting the contrast in the environment, and n represents the number of surfaces of the model.

2.2 Mining Online Teaching Resources of Children's Sports Enlightenment

According to the built online teaching environment of infant sports enlightenment, a complete online teaching resource data set of infant sports enlightenment is established. Through artificial intelligence technology, all the online teaching resource characteristics of infant sports enlightenment in the online teaching resource data set of infant sports enlightenment are reconstructed, and the reconstructed online teaching resource data set of infant sports enlightenment is decomposed [5, 6]. According to the decomposition results, the wavelet variance of children's sports enlightenment online teaching resources is calculated, which is used as the weight to fuse the wavelet coefficients, and the mining results of children's sports enlightenment online teaching resources are obtained.

According to the enlightenment teaching concept from the perspective of artificial intelligence, it can be calculated that the minimum value of the total mean square error of online teaching resource mining of infant sports enlightenment is $\frac{1}{\sum_{i=1}^{q}\frac{1}{\sigma_i^2}}$, and the weighting factor corresponding to $\frac{1}{\sum_{i=1}^{q}\frac{1}{\sigma_i^2}}$ can be expressed as:

$$\delta_i = \sigma_i^2 \frac{1}{\sum_{i=1}^{q}\frac{1}{\sigma_i^2}} \tag{3}$$

Using the weighting factor obtained from formula (3), reconstruct the characteristics of children's sports enlightenment online teaching resources. The formula is:

$$Z_J = \varphi_{J,k} \sum_{k} \frac{h_n(J,k)}{g_n(J,k)} + \sum_{k=0}^{J} \psi_{J,k} \tag{4}$$

In the formula, Z_J represents the reconstructed online teaching resources *of* infant sports enlightenment, $\varphi_{J,k}$ represents the scale function of the online teaching resources of infant sports enlightenment at the J layer, and $h_n(J,k)$ represents the k approximation coefficient of the online teaching resources of infant sports enlightenment, $\psi_{J,k}$ represents the wavelet resource function of children's sports enlightenment online teaching resources at the J layer, and $g_n(J,k)$ represents the k detail resource function of children's sports enlightenment online teaching resources.

Assuming that q resource managers manage multiple online teaching resources X of infant sports enlightenment at the same time, the reserve value of online teaching

resources of infant sports enlightenment in each resource manager can be expressed as:

$$Z_i = \frac{X}{V_i}, i = 1, 2, \cdots, m \tag{5}$$

In the formula, V_i represents the online teaching resource parameters of children's Physical Education Enlightenment in the resource manager.

Assuming that $W_{h,i}$ represents the weighting factor of the approximation parameters of the online teaching resources for children's sports enlightenment, and $W_{g,i}$ represents the weighting factor of the detailed parameters of the online teaching resources for children's sports enlightenment, then:

$$\sigma^2 = E\left[\frac{Z_V^2}{\eta_i} - \sum_{i=1}^{q} W_{h,i}^2 \frac{1}{2}\varphi_{J,k}\right] \tag{6}$$

Suppose δ_i represents the weight in each resource manager and σ_i represents the variance of the parameters of online teaching resources for children's sports enlightenment. Finally, the mining value of online teaching resources for children's sports enlightenment is $Z = \sum_{i=1}^{q} \delta_i Z_i$ and there is $\sum_{i=1}^{q} \delta_i = 1$. The total mean square error of online teaching resources mining for children's sports enlightenment is:

$$\sigma^2 = E\Big[(X - Z)^2\Big] = \sum_{i=1}^{q} \delta_i^2 \sigma_i^2 \tag{7}$$

According to formula (7), it can be known that the weighted mean square deviation of online teaching resources mining of infant sports enlightenment is less than or equal to the optimal weighted mean square deviation of online teaching resources of infant sports enlightenment in time domain, and the online teaching resources of infant sports enlightenment can be remotely scheduled through teaching information, The mean square deviation of online teaching resources for children's sports enlightenment becomes smaller and smaller with the decomposition of scale [7, 8]. The final conclusion provides a theoretical basis for the mining of online teaching resources for children's sports enlightenment.

Assuming that X represents the parameter sequence of managed online teaching resources for children's physical education enlightenment, based on the remote scheduling theory of teaching information, it can be seen that the wavelet transform has the property of energy conservation under the orthogonal wavelet basis. On the basis of time series, the energy can be divided in the scale domain, and the wavelet basis function is used, The energy on the online teaching resource manager of children's physical education enlightenment can be decomposed into:

$$\|X\|^2 = \sum_{i=1}^{J} \|W_J\|^2 + \|V_J\|^2 \tag{8}$$

Then the variance of online teaching resources of infant sports enlightenment obtained from the actual test is:

$$\sigma_X^2 = \frac{1}{N} \| \sum_{N=1}^{N} (X - \overline{X})^2 \| = \left(\left\| W_{j,n} \right\|^2 + \left\| V_{j,n} \right\|^2 \right) \tag{9}$$

Due to the approximation of V_j and $\overline{X}$, the wavelet variance and average wavelet energy on the scale j in formula (9) are normalized to obtain:

$$p_j(E) = \frac{E_j}{E} = \frac{\frac{1}{N} \left\| W_j \right\|^2}{E} \tag{10}$$

In formula (10), E represents the total energy of children's sports enlightenment online teaching resources, the normalized energy sequence of children's sports enlightenment online teaching resources, and $p_j(E)$ represents the ratio of energy of children's sports enlightenment online teaching resources to total energy. Using the distribution of energy sequence of online teaching resources of infant sports enlightenment, obtain the wavelet entropy of online teaching resources of infant sports enlightenment. The specific process is as follows:

$$H_{\text{we}} = H(P) = H(p_1(E), p_2(E), \cdots, p_J(E)) \tag{11}$$

Taking the wavelet entropy of children's sports enlightenment online teaching resources as the fusion weight of children's sports enlightenment online teaching resources, the mining coefficient is obtained. After wavelet transformation, the mining results of children's sports enlightenment online teaching resources are obtained, and the mining of children's sports enlightenment online teaching resources is completed.

2.3 Establish an Online Teaching Quality Evaluation Mechanism for Children's Physical Education Enlightenment

Teaching evaluation is an activity to judge the value of teaching process and results according to teaching objectives and serve teaching decision-making. It is an important basis for teachers to improve teaching strategies and teaching functions. The teaching method from the perspective of artificial intelligence is not mature and may not be able to achieve immediate results. There are still many places to be improved and innovated. Therefore, it is necessary to establish an evaluation mechanism for the teaching quality based on augmented reality. The mechanism needs to combine the characteristics of teaching environment, teaching conditions and teaching content, fully consider the factors such as students' learning psychology and cognitive law, and timely feedback the degree and situation of students' mastery of knowledge, so as to make a comprehensive analysis and judgment on Teachers' overall teaching design, teaching organization and implementation. Combined with the characteristics of online teaching of infant sports enlightenment from the perspective of artificial intelligence, the first-class evaluation indexes of online teaching quality of infant sports enlightenment are established from the four aspects of teaching content, teaching organization, teaching ability and teaching effect. Each first-class evaluation index also includes several second-class evaluation

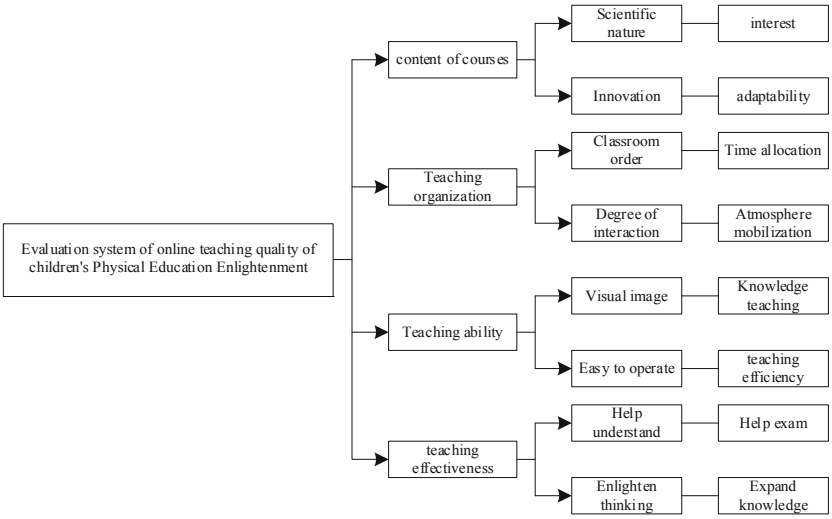

Fig. 1. Online teaching quality evaluation system of infant sports enlightenment

indexes of teaching quality, The online teaching quality evaluation system of infant sports enlightenment from the perspective of artificial intelligence is shown in Fig. 1.

The Fig. 1 shows that children's enlightenment online teaching quality evaluation system respectively from two different aspects of students and teachers of children's enlightenment from the artificial intelligence to evaluate online teaching platform, contains both for platform shows children's enlightenment teaching online content, students feel fun, scientific and innovative, etc., It also includes whether the platform helps teachers to teach knowledge and improve teaching efficiency in terms of teaching ability.

2.4 Design the Online Teaching Process of Children's Sports Enlightenment

In the process of infant sports enlightenment online teaching, clarify the infant sports teaching objectives, select the corresponding teaching content, and select the appropriate teaching methods according to the corresponding teaching content. In this paper, the teaching process of infant physical education is designed for different physical education objectives and physical education teaching contents, such as imparting sports and health knowledge, sports technical skills, developing students' physical quality, cultivating students' collective spirit and cooperative consciousness.

The teaching process of imparting sports and health knowledge is shown in Figure.

According to Fig. 2, in order to enable students to think independently and participate in the knowledge learning in the online classroom of early childhood physical education enlightenment, the classroom teaching of sports and health knowledge is mainly based on inquiry-based teaching method, combined with discussion method, question-and-answer method and teaching method, so as to give play to the subjective active role of students. After putting forward the teaching theme, guide students to pay attention to the self-development and mutual inspiration of students through discussion, communication between classmates, and Q&A interaction between teachers and students. Then

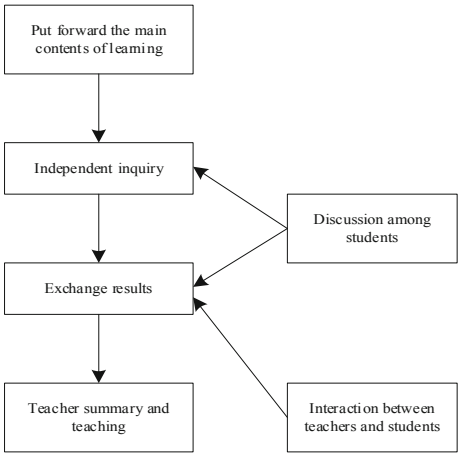

Fig. 2. Teaching process of imparting sports and health knowledge

summarize all the results and communicate with each other. Finally, the teacher summarizes the conclusions of this class, improves students' understanding of knowledge and gives full play to students' initiative in the process of exploring problems through teaching. Inquiry teaching method emphasizes students' subject status and initiative. By studying students' thinking mode and their thinking habit of solving problems, it is good at transforming all kinds of indirect experience into direct experience in students' life situations, and is good at enabling students to combine direct experience with knowledge learned, so as to strive for innovation on this basis.

The physical education teaching process of cultivating sports technical skills is shown in Fig. 3.

According to Fig. 3, heuristic teaching method and other teaching methods to promote students' heuristic learning should be combined with demonstration method, multimedia and other teaching methods. When teaching sports technology, teachers first guide students to play freely and inspire their understanding of the sport. When students really start to think seriously, they can intuitively understand the technical points of the project through teaching methods such as demonstration method and modern multimedia method. In the early stage of sports technology teaching, we should make full use of heuristic method to improve students' ability of self-study and self practice. In this process, physical education teachers should not repeatedly emphasize some details, but let students preliminarily master the general technical movements.

According to the three stages that students experience when learning sports technology, when designing the online teaching method of infant sports enlightenment, three stages of online teaching method of infant sports enlightenment are designed:

Generalization stage teaching method: in this stage, traditional teaching mainly adopts explanation method and demonstration method. Although these two methods are effective, they are difficult to mobilize students' enthusiasm. In the classroom, only the teacher is talking, and other students are just watching. Whether they listen carefully and think actively is unknown to the teacher.

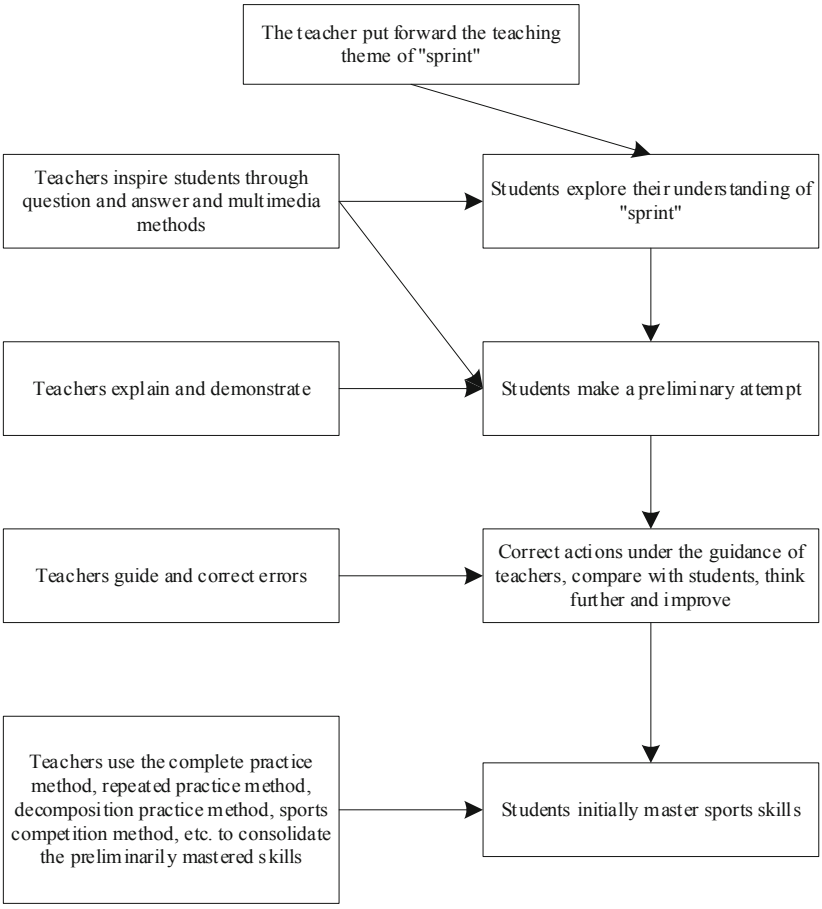

Fig. 3. Physical education teaching process of cultivating sports technical skills

When choosing teaching methods, focus on the teaching methods that can improve students' subjective thinking ability. At the beginning, ask the students to speak out their original "sprint" through question and answer and discussion, and then summarize everyone's understanding of sprint. Teachers affirm the students' correct views and understanding, but the wrong understanding and understanding need to be denied, and let the students know what is wrong through explanation, so as to enhance the teaching effect and activate the classroom atmosphere. And let the students make a preliminary attempt on this basis.

Improve and improve the stage teaching method: at this time, students have a preliminary understanding of sprint, but there are often stiff, uncoordinated, muscle contraction that should not be contracted, and it is very laborious to do the action. At this time, teachers must actively adopt the error correction method to correct students' wrong actions in the process of practice, so that students can gradually eliminate uncoordinated and redundant actions. At the same time, students who master better and students who do not

master better will do the same technical actions at the same time. Through the comparison method, students can intuitively see the difference between the two, so that students can more easily avoid imitating other people's wrong actions and make the actions more and more accurate.

Consolidation skill stage teaching method: after the improvement and improvement of sports technology, students have initially mastered sprint technology, but it is not once and for all. It is necessary to constantly strengthen the focus of technical links and make the technical actions more skilled through a lot of repeated practice. On the contrary, if the practice ends here, it will slowly forget the obtained technical experience. As in the actual survey, the complete practice method, decomposition practice method, repeated practice method and sports competition method widely used by teachers can well consolidate the sports skills learned by students.

3 Experimental Comparative Analysis

3.1 Set Experimental Parameters

In order to verify the performance of the online teaching method of infant sports enlightenment in the field of artificial intelligence in practical application, the experimental parameters are set before the experiment, as shown in Table 1.

Table 1. Experimental parameters

Parameter number	Parameter name	Parameter size
1	Number of people who can be online at the same time	1000 people
2	Fluency parameters	4.72
3	On response time	5.23s
4	User click through rate	96.76%
5	Teaching resource connection parameters	0.98*106
6	Teaching error rate	49.86%

According to the experimental parameters in Table 1, prepare for the experiment in advance to provide a basis for the analysis results.

3.2 Experimental Preparation

In order to verify the effectiveness of children's sports enlightenment online teaching method in the application from the perspective of artificial intelligence, a simulation experiment needs to be designed. The operating system of the simulation experiment selects the Windows7 system computer with 8GB memory and 3.5GHz dominant frequency, and uses MFC to write the simulation program. The calculation operation of the experiment is completed by MATLAB compiler to convert the simulation program into an executable file. The experimental data set collects the data of 1000 users of GaGaMatch teaching platform, including users' browsing records, clicks and favorites.

3.3 Result Analysis

In order to highlight the advantages of the online teaching method of children's sports enlightenment from the perspective of artificial intelligence, the teaching method based on Wushu core literacy and the teaching method based on group experiment are introduced for comparison. The results are as follows.

The test results of video playing fluency of online teaching of infant sports enlightenment by the three methods are shown in Fig. 4.

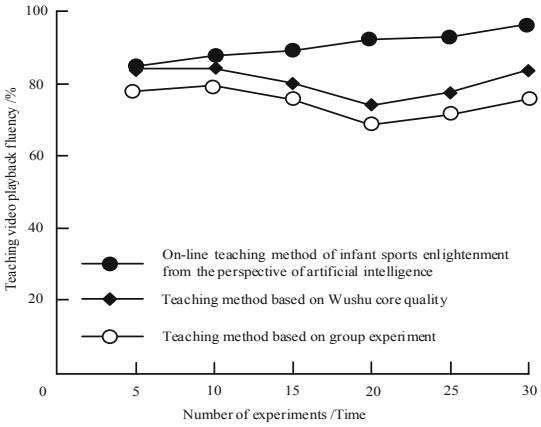

Fig. 4. Test results of playing fluency of online teaching video of children's sports enlightenment

It can be seen from the test results in Fig. 4 that when the teaching method based on Wushu core literacy is used for children's sports enlightenment online teaching, the playing fluency of teaching video reaches 84.5%, and the playing fluency of teaching video decreases significantly from the 10th experiment to the 20th experiment. Although there is an upward trend after the 20th experiment, the range is very small; When the teaching method based on group experiment is used for children's sports enlightenment online teaching, the playing fluency of teaching video is only 76.8%. With the increase of experimental test times, the experimental results fluctuate greatly; However, when using the online teaching method of children's sports enlightenment from the perspective of artificial intelligence for children's sports enlightenment online teaching, the playing fluency of teaching video is as high as 93.4%. Compared with the other two teaching methods, the playing fluency of teaching video is improved by 8.9% and 16.6% respectively, which has certain advantages.

The test results of students' interest in the three methods are shown in Fig. 5.

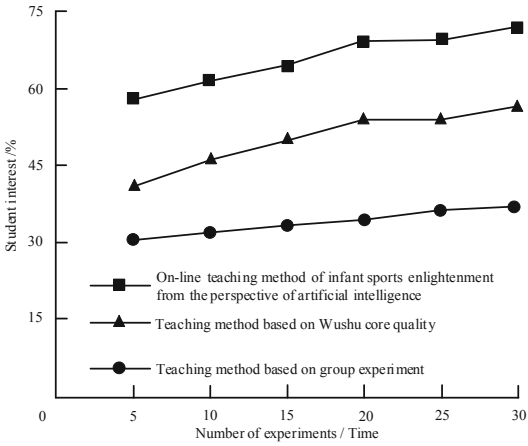

Fig. 5. Test results of students' interest

As can be seen from the experimental results in Fig. 5, when the teaching method based on Wushu core literacy is used for children's sports enlightenment online teaching, the average degree of interest of students is 58.9%. With the increase of the number of experimental tests, the degree of interest of students also increases; When the teaching method based on group experiment is used in the online teaching of children's sports enlightenment, the degree of interest of students is only 35.9%, and the degree of interest of students does not change much with the increase of the number of experiments; However, when using the online teaching method of children's sports enlightenment from the perspective of artificial intelligence for children's sports enlightenment online teaching, the average degree of interest of students is 66.8%, and there is a sudden increase in the degree of interest of students from the 10th experiment to the 20th experiment, which is more than 70%; Overall, the proposed online teaching method of infant sports Enlightenment has certain robustness.

4 Conclusion

This paper puts forward the research on the online teaching method of children's sports enlightenment from the perspective of artificial intelligence. Its innovation point is that reasonable teaching methods can better realize the teaching objectives and complete the teaching tasks. Therefore, the majority of physical education teachers need to fully understand the characteristics and functions of each teaching method, on the basis of the usual physical education teaching methods, absorb advanced physical education teaching methods, through the effective combination of physical education teaching methods, better improve the teaching effect. The test shows that this method can enhance the playing fluency of teaching video and improve the degree of interest of students. However, there are still many deficiencies in the research of this paper. In the future

research, it is hoped that machine learning algorithm can be introduced to improve children's PE learning level.

References

1. Chai, G., Sun, Y.: Effective teaching strategies of Wushu in primary and secondary schools aiming at core accomplishment of martial arts. J. Wuhan Inst. Phys. Educ. **54**(4), 87–92 (2020)
2. Gao, X.: Practice and re-understanding of scientific exploration of multi-dimensional form from the perspective of elements - from the perspective of teaching framework, the research on the design of various exploration methods of "isothermal change of gas." Physics Teaching in Middle School **49**(4), 1–8 (2020)
3. Zhang, Y., Jin, Z., Chen, Y.: Hybrid teaching-learning-based optimization and neural network algorithm for engineering design optimization problems. Knowl.-Based Syst. **187**(1), 1–18 (2020)
4. Yao, L., Shi, Z.: Research on artificial intelligence curriculum system and teaching methods. China University Teaching **10**, 19–22 (2019)
5. Liu, R., Zhang, H., Wang, Z., et al.: Online teaching scheme of integrating COVID-19 pneumonia into immunology teaching. Chinese Journal of Immunology **36**(17), 2152–2155 (2020)
6. Yan, Z., Wang, M., Sha, X.: Study on the improved teaching method in direct ophthalmoscopy. Chongqing Medicine **49**(2), 212–214,218 (2020)
7. Gao, Y., Hao, Y., Pan, D., et al.: Practice of online blended teaching method under background of public health emergencies. Heilongjiang Researches on Higher Education **8**, 155–160 (2020)
8. Yan, X.X., An, X.W., Dai, W.B., Sun, N.L.: Image segmentation teaching system based on virtual scene fusion. Computer Simulation **38**(4), 331–337 (2021)