Research Article

Application of Artificial Intelligence-Based Big Data AI Technology in Physical Education Reform

Feng Cao,1 Ming Lei,2 Sen Lin,3 and Maojuan Xiang1

1Department of Physical Education, Xidian University, Xi’an 710071, Shaanxi, China
2Department of Physical Education, Xi’an Foreign Studies University, Xi’an 710071, Shaanxi, China
3Department of Physical Education, Shaanxi University of Science and Technology, Xi’an 710016, Shaanxi, China

Correspondence should be addressed to Maojuan Xiang; xiangmaojuan@xidian.edu.cn

Received 9 June 2022; Revised 2 August 2022; Accepted 17 August 2022; Published 10 September 2022

Copyright © 2022 Feng Cao et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Nowadays, physical education teachers are constantly accepting and absorbing the concepts and ideas of the new curriculum standards, but there are still problems in understanding the new curriculum standards, the selection of teaching content is single, and the content is outdated. In addition, the teaching content and teaching methods of physical education also take the students’ test scores as the ultimate goal and have not really implemented the guiding ideology of “health first,” so the reform of physical education is imperative. This paper starts with the investigation of college students’ online courses and traditional classroom learning and analyzes what requirements these students who have received online courses have on university classrooms. Secondly, through in-depth observation of university classrooms, we can understand the current situation and existing problems of university classroom teaching. Based on the innovative characteristics and advantages of artificial intelligence big data AI technology, this paper designs a smart service platform for smart sports classrooms in colleges. The platform can timely find out the problems existing in the process of students’ physical education so as to solve them in time. Through the comparison between the experimental class and the control class, it is verified that the platform improves the reliability of PE classroom teaching. Judging from the practice density of the 25PE classes observed, the highest practice density reached 57.5%, and the average density was 41.6%. During the interview, we learned that the practice density of most physical education teachers in each class is controlled at about 45%, which is close to the average practice density obtained by the survey. This paper provides a practical basis for the reform of physical education teaching.

1. Introduction

Physical education in China’s general institutions of higher learning is constantly advancing in the process of continuous exploration and development. It is necessary to make students adapt to the fierce market competition in today’s society as soon as possible and cultivate physical education talents who adapt to the society. There are many theoretical researches on diversified teaching, most of which focus on introduction, analysis, and evaluation, while there are few practical research studies on indepth classroom teaching. Therefore, a comprehensive understanding of ordinary colleges and universities will help to better explore new ideas of sports reform in order to better carry out education and teaching in ordinary colleges. The requirements for students in all make them face more and more fierce competition in career selection and employment. As a result, they are increasingly stressed in terms of life, study, and emotions. The deep integration of AI and big data, mutual promotion, and continuous innovation have created a historic opportunity for smart sports classrooms. The reform of PE teaching in universities is conducive to promoting the informatization construction of physical education classes. An educational process or social activity aimed at imparting physical education culture, strengthening physical and mental development, and cultivating good moral character and social adaptability.

The implementation program for the reform of physical education in schools should be clear and clear, with prominent points, strong pertinence, and high practicability. Hastie P A believed physical education is part of the public
school curriculum [1]. Yildizlar believed that professional sports practice contributes to the development of individual potential [2]. Hodges believed that researchers have determined that children of all ages have low levels of health-related fitness knowledge (HRFK). Improving learning areas in physical education, such as students’ HRFK, often requires a comprehensive effort [3]. Silverman reviewed theoretical models prevalent in attitude research [4]. Fernandez-Rio studies kickboxing teaching [5]. The physical education reform method they proposed is not intelligent enough, and this paper optimizes it by combining artificial intelligence and big data.

Artificial intelligence is an important driving force for a new round of technological revolution and industrial transformation. Rongpeng highlighted the emergence of initial smart technologies [6]. Liu provided a comprehensive review of artificial intelligence algorithms [7]. Having a belief that sensor nodes use technologies such as artificial intelligence to collaboratively detect events [8]. Burton provided links to AI resources for educators [9]. Polina encouraged continuous patient health monitoring [10]. Their research on artificial intelligence is relatively narrow, and they will further explore AI later.

By analyzing the use of AI terminal equipment, the basic situation of AI physical education classroom, and the challenges and opportunities faced by intelligent physical education classroom, this paper explores a scientific and reasonable construction path for intelligent physical education classroom and provides support for subsequent intelligent classroom research [11]. It provides useful reference for the theory and practice of physical education in colleges. Through a questionnaire survey, this paper investigates the use of college students’ sports apps and wearable devices and the use of AI sports terminals by college students to provide data support for AI sports classroom research [12]. Through the SPSS analysis method, the sports APP and wearable devices are used to analyze the sports-assisted classroom teaching, which provides a basis for the research of artificial intelligence sports classroom. Through the interviews, the basic situation is analyzed, and finally, the construction path of smart sports classrooms in colleges is proposed. Explanation and demonstration were used the most, the proportion reached 86.3%, and the complete method and decomposition method accounted for 79.6%. For students, the proportion of users with “excellent,” “good,” “moderate,” and “poor” cognitive levels are 11%, 38%, 45%, and 7%, respectively. To a certain extent, the validity of the students’ cognitive model is verified [13].

2. Reform of Physical Education Teaching

2.1. Physical Education. The relationship between teaching and students’ needs in physical education: students engaging in sports activities are always driven by their own needs. School physical education is aimed at ordinary students rather than athletes. Their requirements for physical education classes are mainly to adjust the tense atmosphere of learning, relax the spirit and body, focus on fitness, and include entertainment in it. The purpose of physical education should be to invigorate the spirit, activate the muscles and bones, strengthen the body, students can learn the basic methods of physical fitness, and let students use different fitness methods in different natural environments and living conditions to continuously improve themselves, so that they can be physically and mentally healthy during their studies and benefit from life after graduation [14]. If we want to develop a variety of physical education teaching models, we cannot be bound by the existing teaching models. Instead, we should change the way of thinking, change the angle of thinking, boldly adopt new pedagogical and psychological theories, and adopt new methods to create a new physical education teaching environment [15].

Through the linear change of the original sports performance data, the value is mapped to the range of [0, 1], and the transformation function is as follows:

\[
x = \frac{x - x_{\min}}{x_{\max} - x_{\min}}.
\]

The PE data transformation function after processing is

\[
x = \frac{x - \theta}{\rho}.
\]

The processed student performance cost function is as follows [16]:

\[
H_t = -\sum_{i=1}^{n} \left( d_i \ln y_i - (1 - d_i) \ln y_i \right).
\]

In the formula, \( d_i \) is the correct output of the students’ sports scores and \( n \) is the number of students.

One of the main contradictions in the field of physical education is the contradiction between the diversity of physical education ideas and teaching objectives and the unity of physical education models [17]. The integration of artificial intelligence technology into physical education is the focus and difficulty of physical education, gradually transforming from abstract and vague concepts into concrete steps and transforming the indescribable macroscopic system into microscopic descriptions. For example, in the process of basketball teaching, it is difficult for physical education teachers to describe the height of the jump, the strength of shooting, and related skills in accurate language. Even with repeated demonstrations, it is difficult to ensure that every student can memorize the essentials of the movements. Due to the poor grasp of the order of jumping and shooting, students often make mistakes in jumping or synchronizing jumpers during the actual operation. With the addition of artificial intelligence technology, this seemingly complex and difficult problem will become simple and easy to understand [18]. In the whole process of the jump shot technology screening, the physical education teacher only needs to explain the key points and difficulties, and the students can easily understand the skills in each jump shot link, so as to help students master the technical essentials. Based on the above, it can be seen that the application of artificial intelligence technology to physical education can not only make up for the dullness of traditional teaching and lack of three-dimensional sense but also
ensure that students can master the key and difficult points of movements in a relaxed environment and achieve a multiplier effect. Such a teaching process not only reduces students’ willingness to learn but also reduces teachers’ teaching pressure and difficulty and ensures the activity of classroom atmosphere and the improvement of students’ learning efficiency [19].

Assuming that the number of student sample points is \( n \), the average scores of students in the judgment rule are as follows:

\[
\epsilon_{AVG} = \frac{\epsilon_A(x_1) + \epsilon_A(x_2) + \ldots + \epsilon_A(x_n)}{n}.
\]

The calculation method of the support \( (s) \) and confidence \( (c) \) of students’ PE teaching performance can be expressed as follows:

\[
s(x \rightarrow y) = \frac{\rho(x \cup y)}{N},
\]

\[
c(x \rightarrow y) = \frac{\rho(x \cup y)}{\rho(x)}.
\]

Among them, \( \sigma(x) \) represents the number of transactions containing item set \( x \) in the dataset, namely [20],

\[
\sigma(x) = |t_i| x \subseteq t_i, t_i \in T |.
\]

2.2. Artificial Intelligence and Big Data. Both mobile data exchange and Internet data exchange are accompanied by digitization, and the amount of information has also exploded exponentially. Big data contains real and valuable information, and big data technology comes into being. Through big data, massive data can be extracted, processed, and analyzed according to people’s needs, and the data can be reused and recycled to better serve individuals. Information entropy of physical education performance:

\[
H(X) = -\sum_{i=1}^{n} P(X_i) \log P(X_i).
\]

Assuming that the sample set of student scores is \( T \) and the size is \( t \), the probability that a sample belongs to \( C_i \) is

\[
p_i = \frac{t_i}{t}.
\]

Entropy required to classify student grade sample \( T \) [21]:

\[
I(t_1, t_2, \ldots, t_a) = -\sum_{i=1}^{a} p_i \log P(X_i).
\]

2.3. University Smart Sports Classroom Information Service Platform. The intelligent service platform of AI sports classroom in colleges and universities fully reflects people-centered, including AI terminal equipment platform, stadium AI platform, and health cloud management platform; it organically combines the three elements of the smart sports classroom in colleges and universities: people (students, teachers, parents, experts, and scholars), terminals (smart equipment), and venues (sports venue equipment) [22]. Provide an intelligent, information-based, and integrated service support environment for sports classrooms through the information platform of one cloud (health cloud management) and one stadium (sports venue) (intelligent terminal equipment). It changed the traditional concept of education, provided the latest and most effective educational resources for the educated, and had a great impact on the current education system [23]. The intelligent sports classroom information service platform in colleges is shown in Figure 1 [24].

Usually, the abnormal data points of physical exercise are located in the low-density area and are relatively far away from the neighboring points. It is thus possible to define the density of an element \( x \) as the ratio of 1 to the average distance to \( k \) neighbors:

\[
density(x,k) = \left( \frac{\sum \text{distance}(x,y)}{|N(x,k)|} \right)^{-1}.
\]

Among them, \( N \) represents the set of \( k \) neighbors containing \( x \) [25].

Constructing the fitness function of physical education reform is mainly to quantify the constraints in the timetable according to different priorities, and its expression is as follows:

\[
F = \sum_{i=1}^{n} f(i) \cdot g(i).
\]

Among them, \( f(i) \) is the quantized value of each condition. The formula between physical education pheromone and fitness:

\[
P_{ij} = \sum_{i=1}^{N} \sum_{j=1}^{M} (F_{ij} + P_{(i-1)j}).
\]

In the formula, \( C \) is the student’s pheromone constant, \( P \) represents the pheromone in the achievement interval, and \( F \) represents the fitness in the achievement interval.

The platform is the cloud-based smart database of smart physical education classrooms in colleges. Collect, store, manage, and present the data of smart sports classrooms in colleges through automatically uploaded to the health cloud management platform through the network, and the processing and analysis are completed with the cloud platform and finally presented. The construction of the health cloud management platform can rely on the existing cloud infrastructure system of the school. Develop a cloud management platform for smart sports classrooms on the basis of existing ones. It is also possible to establish a professional private cloud management platform for the school’s smart physical education classroom by means of service outsourcing by relying on the public service platform provided by relevant educational enterprises. However, subsequent operation and maintenance upgrades require professional talents and technologies to manage. It provides a reference for the reform and development of physical education and finally enables students to develop a lifelong sports awareness from the curriculum.
The loss function of the network is as follows:

\[
C = \frac{1}{2}W^2 + \frac{1}{2}V^2 + \sum_{i=1}^{N} \max(0, r - \bar{y}_i).
\]  

(13)

In general, each layer contains multiple neurons, and the input and output of neurons are many-to-one. If a neuron has a total of \(N\) inputs \(x_i (i = 0, 1, ..., N-1)\), its output is \(y\); then,

\[
y = f \left( \sum_{i=0}^{N-1} w_i + b \right).
\]  

(14)

If the mean of a sports training batch \(X\) is \(\mu\) and the standard deviation is \(\sigma\), then

\[
\tilde{x} = \frac{x - \mu}{\sqrt{\sigma + \epsilon}}.
\]  

(15)

The standardized results of physical education data are

\[
BN_{y,\phi}(x) = y\tilde{x} + \beta.
\]  

(16)

Smart sports classroom is based on cloud computing, big data, Internet, Internet of Things, and other scientific and technological support. The intelligent teaching mode of classroom intelligent push, information management, and process evaluation is realized through the "cloud-library-terminal" intelligent service platform. Based on the characteristics of the main body structure of smart sports, the main body construction of smart sports classroom is from bottom to top, which is the basic construction layer, the data processing layer, the end-use service layer, and the teaching realization layer. The AI terminal equipment platform is all kinds of intelligent terminal equipment tools. The AI terminal equipment platform is the terminal and the front end of the intelligent sports information platform in colleges. It is the basic means and tool for teachers and students to carry out intelligent sports classroom teaching. On the one hand, the function of the intelligent terminal equipment platform is to collect data, collect information, and transmit the data to the health cloud management platform through the Internet, and on the other hand, it is also to feed back and present the results of cloud data analysis: network learning, breaking the boundaries of time and space; personalized learning, to meet the differences of students; shared learning, to achieve reasonable allocation of resources; personalized learning, to stimulate enthusiasm for learning, and so on. For different objects of use, the intelligent terminal platform can be divided into student terminal, teacher terminal, environmental terminal, and even parent terminal, and the management terminal can be configured. The smart terminal refers to the terminal smart tools for students in smart sports classrooms to perform physical exercise, such as sports APP and wearable smart devices. Teachers’ intelligent terminal tools are attendance machines, score testing equipment, and score entry devices. Environmental terminal tools such as physical monitoring smart devices and electronic timers. The intelligent terminal device platform is shown in Figure 2.

2.4. Experimental Design of Physical Education Teaching.

In this paper, a total of 36 hours of experimental teaching was given to 160 experimental subjects. The teaching of the control group was carried out according to the syllabus of
the college. The experiment tests the teaching effect of the teaching reform design through the comparison of students’ physical test data, the comparison of final test results, and the comparison of physical exercise attitudes. The experimental group used a combination of traditional teaching and smart sports classroom information service platform for teaching. However, the control group was taught by traditional teaching methods. After the experimental teaching, the students’ scores were counted as the basis for judgment.

“Split information” for sports performance attributes:

\[
split(A) = \sum_{j=1}^{n} \frac{|S_j|}{S} \times \log_2 \frac{|S_j|}{S}.\]

(17)

The information gain rate of the sample set:

\[
gain\, ratio(A) = \frac{\text{gain}(A)}{\text{split}(A)}.
\]

(18)

The degree of improvement in sports performance is expressed as:

\[
lift(A \rightarrow B) = \frac{\text{support}(A, B)}{\text{support}(A) \times \text{support}(B)}.
\]

(19)

2.5. Mathematical Statistics. SPSS (SPSS is the first statistical software in the world to use a graphical menu-driven interface) software was used to process and analyze the data collected by the questionnaire star, mainly to analyze the correlation between the genders of male and female college students on the use of sports APP and wearable devices for college students. According to the statistical requirements of sports scientific research methods, combined with the research needs, the corresponding \(P\) test, sample correlation coefficient test, \(t\)-test, mean, and standard deviation were calculated.

3. Results of Physical Education Reform

The evaluation criteria are divided into five dimensions: very reasonable, relatively reasonable, general, unreasonable, and very unreasonable. Among the 10 experts, 6 experts think that the teacher questionnaire is reasonable in general, 4 think it is more reasonable, and finally modify and improve it according to the opinions of experts. The expert title and questionnaire validity test evaluation of the questionnaire validity test are shown in Figure 3.

Reliability refers to the reliability of the data. The collected data are tested and analyzed to determine whether the data can accurately reflect the objective phenomenon. The test-retest method is adopted in this paper for reliability testing. 15 physical education teachers from a school were randomly selected for the first test. The second test is on the same population with the same sample after 20 days. SPSS19.0 was used to carry out statistical analysis on the relevant data, and the correlation coefficient of the questionnaire was obtained. The correlation coefficient \(R\) of the questionnaire was all greater than 0.8, \(P < 0.05\). The reliability test of the questionnaire is shown in Table 1. Experts make comprehensive evaluations around students’ “learning” (sports participation, physical activity, and student satisfaction) and teachers’ “teaching” (teaching attitude, teaching speech act, diverse teaching elements, and teaching ability) according to diversified curriculum design ideas and teaching case designs. Teachers who observe classes use multifaceted systematic evaluation tools to dynamically monitor the demonstration classes and obtain timely data. The physical education teaching strategy of this paper has the participation of a large number of students, and the students can freely arrange and choose the learning courses and progress according to their own learning background knowledge, goals, skills, and their own learning interest.

It can be seen from Figure 4 that the explanation and demonstration are used the most, with a proportion of 86.3%; the complete method and the decomposition method are second with 79.6%; and the third is the error prevention and correction method, accounting for 71%. These three teaching methods are all teacher-centered teaching methods, mainly based on teacher’s teaching. However, the proportion of student-centered teaching methods such as discovery teaching method, inquiry teaching method, comprehension teaching method, and cooperative teaching method is far from that of the first three teacher-centered teaching methods. The teaching method of traditional physical education students is shown in Figure 4. PE teachers should try to maintain the diversity of teaching thinking styles and adopt different styles according to different teaching situations. Teachers choose AI and big data physical education content for AI and big data PE teaching. In this way, people can absorb the advantages of different teaching styles, promote teachers’ tireless pursuit and improvement of AI and big data physical education teaching styles, and stimulate teachers’ enthusiasm for teaching reform, so as to create colorful and diverse teaching styles. In the teaching design of physical education courses, on the basis of understanding the teaching concepts, the ideas of AI and big data teaching are integrated into all aspects of classroom teaching.

Judging from the practice density of the 25 physical education classes observed, the highest practice density reached 57.5%, and the average density was 41.6%. During the interview, we learned that most physical education teachers control the practice density of each class at about 45%, which is close to the average practice density obtained from the survey. However, compared with the 2019 International Physical Education Curriculum and Teaching
Conference, the movement density of each class should be above 75%. A certain gap in the Chinese healthy physical education curriculum model, which is mainly based on activities and competitions. Excessive lectures and insufficient practice time in physical education violate the characteristics of physical exercises in physical education. It makes the PE classroom become the teaching of PE teachers, ignoring the subjectivity of students, ignoring the physicality of physical education teaching and making physical education teaching gradually converge to intellectual education teaching. The practice density of PE students is shown in Figure 5.

35.3% of physical education teachers never use information media for teaching; 30.5% of teachers say they rarely use it; 17.1% of teachers say they use it occasionally; only 17.1% of teachers say they use it often. However, through interviews, people learned that most teachers use mobile phones or tablet computers to collect teaching materials to carry out information-based teaching. Overall, the level of information-based teaching needs to be improved. Informationization teaching is the trend of modern teaching, and it can be popularized in all disciplines, but its application in the field of school physical education is still at a low level, and many informatization equipments are lacking in our schools. The school’s economic conditions also do not allow the introduction of more and more advanced information-based teaching equipment. The information teaching situation of physical education teachers is shown in Figure 6.

This paper expands the new ideas of school physical education teaching. The AI teaching model is very good in teaching evaluation such as teaching satisfaction, learning gain, interest stimulation, and teaching level recognition. This kind of diversified teaching further arouses students’ interest in learning.

PE teachers pay more attention to cultivating students in their daily physical education teaching, and 40% of teachers say they pay more attention to the cultivation of students’ PE knowledge and skills. 30.5% of teachers said they paid more attention to the cultivation of students’ sports interest; 16.3% of students’ sports attitudes and values; 13.2% of other aspects. Comparative analysis shows that more physical education teachers pay attention to PE knowledge and skills. No matter which teaching method is adopted by most PE teachers, the ultimate goal is to emphasize students’ learning of PE knowledge and skills. In order to improve the students’ sports performance, achieve good results in key tests such as entrance exams. It is understandable that physical education teachers attach importance to the transmission of students’ physical education knowledge and skills in teaching. However, overemphasizing the transfer of knowledge and skills will easily lead to the training of physical education, thereby ignoring the cultivation of students’ physical attitudes and values. For a long time, students will inevitably have a conflict with sports, and it is difficult to form a correct sports cognition. The places that physical education teachers pay more attention to when teaching are shown in Figure 7.

When preparing lessons, physical education teachers combine traditional teaching methods with modern teaching methods by adopting collective lesson preparation methods and select corresponding teaching methods and
teaching methods according to the content of different sports units. Teacher AI and big data PE need to start from strengthening teachers’ awareness of AI and big data PE, improving teachers’ teaching diversification strategies and cultivating teachers’ ability to reflect. The diversification of students’ learning styles requires that teachers’ teaching styles should also be diversified, and teachers need to incorporate diverse teaching styles into teaching innovation activities. Teacher AI and big data physical education should carry out diversified teaching from three aspects: teaching role, teaching method, and learning method. Among the students who responded to the valid questionnaires, the data from their sports information needs showed that the average of students who affirmed the significance of AI technology was as high as 90%. The cognitive survey of students’ needs for AI is shown in Table 2. Students’ thinking styles are consistent with teachers’ thinking styles, and learners will form their own learning styles by observing the style of role models. It can be seen that the diversity of teachers’ teaching styles helps to accommodate the diversity of students’ learning styles. Therefore, in sports activities, in order to cater to more styles of students, teachers should try more teaching methods on the basis of understanding and use different styles to benefit students.

Different teaching evaluation methods will also determine students’ learning and thinking methods, teaching
content, and how teachers teach. In the process of PE diversified teaching reform, teachers need to use flexible teaching evaluation methods. 95.66% of the experts believe that the application of the AI service platform in physical education is feasible. The proportion of people who think it is feasible and not feasible is shown in Figure 8.

Most of the students said they liked the way of learning in the environment of the intelligent service platform of smart sports classrooms in colleges. Table 3 shows the comparison of student performance between tennis teaching and traditional teaching. Students not only know how to complete the action but also learn to think about why the action must be done in this way, that is, to improve the perception and memory process to the level of logical thinking. In addition, due to the expansion of knowledge scope, students’ thirst for knowledge continues to increase.

With the advancement of the basic curriculum reform, different changes have taken place in physical education courses in different countries, mainly reflected in the increase of sports items in PE classes, and students have the opportunity to choose different sports items according to their own interest. 93% of the students in the experimental group believed that they could or basically master two or more motor skills through sports, while only 51% in the reference group, an increase of 42 percentage points. The acquisition of physical skills in the experimental group and the control group is shown in Table 4.

Table 2: Students’ cognitive survey on AI needs.

| Index            | Important | General | Unimportant |
|------------------|-----------|---------|-------------|
| Access to information | 90        | 5       | 5           |
| AI technology    | 70.77     | 22.81   | 6.42        |
| Lifelong sports  | 80.33     | 13.2    | 6.47        |
| Auxiliary teaching | 80.44    | 13.82   | 5.74        |

Figure 6: Informatization teaching of physical education teachers.

Figure 7: What physical education teachers pay more attention to when teaching.

Table 3: Comparison of student performance between tennis teaching and traditional teaching.

| Practice time (s) | Observation (s) |
|-------------------|-----------------|
| 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 0                 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |

- Often
- Occasionally
- Rare
- Never
In the experimental results, negative interest decreased significantly \( (T_{\text{Qingji interest}} = -3.275, P < 0.01) \). However, boys' interest in sports learning in the experimental group compared with before the experiment is meaningless \( (T_{\text{boys, total interest}} = 1.782, P > 0.05) \). In terms of dimensions, except for independent exploration and attention to sports, there was no significant change in active interest, sports participation, and awareness of sports \( (T_{\text{active interest}} = 0.049, P > 0.05; T_{\text{sports participation}} = -1.635, P > 0.05; T_{\text{awareness of sports}} = 0.442, P > 0.05) \). Therefore, this result shows that there is an obvious "gender" effect in the teaching reform of physical education diversity in the ninth grade. The ninth grade of the university has improved the independent exploration ability and sports attention of male and female students due to the diversified physical education teaching reform that focuses on the selection of male and female classes. And, the effect on stimulating and improving girls' interest in sports learning is more significant. The comparison between male and female physical education is shown in Table 5.

The database can synchronously record relevant information from clients, and the processing of information can achieve the expected effect, but when the number of clients accessing at the same time exceeds 50, the data update speed is relatively slow. This is mainly due to the defects of the Access (Microsoft Office Access) software itself. In addition, when the students who participated in the test were asked to register as users and answer the questions carefully, statistical data showed that 36% and 43% of the students who were studying were rated as “good” and “medium,” respectively. The proportions of users at the “excellent” and “poor” levels were 7% and 14%, respectively. For junior students, the proportions of users with “excellent,” “good,” “moderate,” and “poor” cognitive levels are 11%, 38%, 45%, and 7%, respectively. The validity of students’ cognitive model is verified. Test results of the AI physical education teaching system are shown in Figure 9.

Education has always been one of the hot issues that the country pays attention to. Education is not only related to the fate of the country but also a major event that affects the development of people’s livelihood. Schools need to explore new content of PE classes according to their own actual situation. Introduce various projects such as fashion sports and orienteering to students, and try to diversify the teaching content of PE courses. 15%, 9%, and 11% of students believe

![Figure 8: Percentage of people who think it is feasible and not feasible.](image)
that the intelligent service platform of smart sports classrooms in colleges can improve their interest in learning. 20% and 25% of students believe that it improves the understanding of abstract thinking better than traditional teaching methods. 20% of students think it is worth promoting. Figure 10 shows the recognition of the intelligent service platform for smart sports classrooms in colleges.

### 4. Conclusions

In order to change the unfavorable situation of PE teaching, we hope to develop a fully functional intelligent college PE course teaching system with the help of AI and big data. In this way, students’ interest in learning can be stimulated, their self-learning ability can be cultivated, the teaching

| Group          | Testing time          | Boys (front vs. back) M ± SD | Girls (front vs. back) M ± SD |
|----------------|-----------------------|-----------------------------|------------------------------|
| Control group  | Before the reform experiment | 22.62 ± 7.92                | 22.24 ± 7.40                 |
|                | After the reform experiment | 29.72 ± 6.02                | 29.72 ± 6.29                 |
| Test group     | Before the reform experiment | 44.89 ± 2.64                | 40.44 ± 2.66                 |
|                | After the reform experiment | 44.8 ± 2.28                 | 40.69 ± 2.20                 |
effect of college PE courses and reform of PE teaching can be improved, and important role of college PE courses can be brought into full play. This is the fundamental reason for choosing the intelligent service platform for smart sports classrooms in colleges as the research content, and it is also the fundamental significance of this paper. The effect of the sports AI teaching reform is significantly better than that of the control group that has not yet implemented the AI teaching reform, which can effectively promote the continued implementation of the teaching reform. Therefore, effectively carrying out the reform of sports diversification, better promoting the specialization of sports, and linking the interest in sports, so as to meet the objective requirements of school sports to achieve the goal of “three-in-one” are the realistic needs to realize the integration of sports curriculum reform. To actively and effectively promote and implement the diversified teaching reform of PE, we just need to strengthen the training of physical education teachers' awareness and ability of diversified teaching, activate the source of high-quality teachers for diversified PE, and consolidate the backup force of diversified physical education. It has built a good learning platform for sports learners all over the world, allowing them to understand a new learning mode. This article does not take the teaching staff as a reference. In the future work, while paying attention to PE reform, it also needs to be adjusted appropriately according to the physical fitness of the students, especially the development of speed, strength, and flexibility.

Data Availability

This article does not cover data research. No data were used to support this study.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

This work was supported by 2021 Shaanxi Province Teaching Reform Project (21BY052) and 2021 Xidian University Higher Education Teaching Reform Project (B21040).

References

[1] P. A. Hastie, S. Chen, and A. J. Guarino, “Health-related fitness knowledge development through project-based learning,” Journal of Teaching in Physical Education, vol. 36, no. 1, pp. 119–125, 2017.

[2] G. Yildizer, C. Ozboke, R. Tascioglu, and I. Yilmaz, “Examining attitudes of physical education teacher education program students toward the teaching profession,” Montenegrin Journal of Sports Science and Medicine, vol. 6, no. 2, pp. 27–33, 2017.

[3] M. Hodges, P. H. Kulinnna, C. Lee, and J. Y. Kwon, “Professional development and teacher perceptions of experiences teaching health-related fitness knowledge,” Journal of Teaching in Physical Education, vol. 36, no. 1, pp. 32–39, 2017.

[4] S. Silverman, “Attitude research in physical education: a review,” Journal of Teaching in Physical Education, vol. 36, no. 3, pp. 303–312, 2017.

[5] J. Fernandez-Rio and J. I. Menendez-Santurio, “Teachers and students’ perceptions of a hybrid sport education and teaching for personal and social responsibility learning unit,” Journal of Teaching in Physical Education, vol. 36, no. 2, pp. 185–196, 2017.

[6] S. Rongpeng and Z. Li, “Intelligent 5G: when cellular networks meet artificial intelligence[1],” IEEE Wireless Communications, vol. 24, no. 5, pp. 175–183, 2017.

[7] R. Liu, B. Yang, E. Zio, and X. Chen, “Artificial intelligence for fault diagnosis of rotating machinery: a review,” Mechanical Systems and Signal Processing, vol. 108, no. AUGH, pp. 33–47, 2018.

[8] P. Havinga, N. Meratnia, and M. Bahrepour, “Artificial intelligence based event detection in wireless sensor networks [J],” University of Twente, vol. 85, no. 6, pp. 1553–1562, 2017.

[9] E. Burton, J. Goldsmith, S. Koenig, B. Kuipers, N. Mattei, and T. Walsh, “Ethical considerations in artificial intelligence courses,” AI Magazine, vol. 38, no. 2, pp. 22–34, 2017.

[10] M. Polina, O. Lucy, and Y. Yu, “Converging blockchain and next-generation artificial intelligence technologies to decentralize and accelerate biomedical research and healthcare[1],” Oncotarget, vol. 9, no. 5, pp. 5665–5690, 2018.

[11] S. N. A. Al, “The regulation and influence of physical exercise on human body’s neutrosophic set, respiratory system and nervous system,” International Journal of Neutrosophic Science, vol. 18, no. 3, pp. 111–124, 2022.

[12] R. A. Ramadan, “An improved group teaching optimization based localization scheme for WSN,” International Journal of Wireless and Ad Hoc Communication, vol. 3, no. 1, pp. 08–16, 2021.

[13] M. S. Khalifa and A. N. A. Al-Masri, “An optimal teaching and learning based optimization with multi-key homomorphic encryption for image security,” Journal of Cybersecurity and Information Management, vol. 7, no. 2, pp. 77–84, 2021.

[14] S. Makridakis, “The forthcoming Artificial Intelligence (AI) revolution: its impact on society and firms,” Futures, vol. 90, no. June, pp. 46–60, 2017.

[15] Y. D. D. Izquierdo, “Computer network design for the teaching area of the elviracapa library,” Journal of Intelligent Systems and Internet of Things, vol. 5, no. 1, pp. 49–53, 2021.

[16] M. M. U. Rathore, A. Paul, A. Ahmad, B. W. Chen, B. Huang, and W. Ji, “Real-time big data analytical architecture for remote sensing application,” Ieee Journal of Selected Topics in Applied Earth Observations and Remote Sensing, vol. 8, no. 10, pp. 4610–4621, 2015.

[17] A. admin, D. DrPKavitha2, A. Akshaya, P. PShalin, and R. RRamyaya, “A survey on cyber security meets artificial intelligence: AI– driven cyber security,” Journal of Cognitive Human–Computer Interaction, vol. 2, no. 2, pp. 50–55, 2022.

[18] W. A. Guenther, M. Mehrizi, and M. Huysman, “Debating big data: a literature review on realizing value from big data[],” The Journal of Strategic Information Systems, vol. 26, no. 3, pp. 191–209, 2017.

[19] L. Zhou, S. Pan, J. Wang, and A. V. Vasilakos, “Machine learning on big data: opportunities and challenges,” Neurocomputing, vol. 237, no. 10, pp. 350–361, 2017.

[20] Y. Zhang, S. Ren, Y. Liu, and S. Si, “A big data analytics architecture for cleaner manufacturing and maintenance processes of complex products,” Journal of Cleaner Production, vol. 142, no. 2, pp. 626–641, 2017.
[21] E. J. Lee, Y. H. Kim, N. Kim, and D. W. Kang, "Deep into the brain: artificial intelligence in stroke imaging," *Journal of Stroke*, vol. 19, no. 3, pp. 277–285, 2017.

[22] E. Mohamed, "The relationship between artificial intelligence and Internet of Things: a quick review," *Journal of Cybersecurity and Information Management*, vol. 1, no. 1, pp. 30–34, 2020.

[23] P. K. Shukla and P. K. Shukla, "I-DMAC: an intelligent DMA controller for utilization-aware video streaming used in AI applications," *Journal of Cybersecurity and Information Management*, vol. 8, no. 2, pp. 60–70, 2021.

[24] H. Lee, F. M. Troschel, S. Tajmir et al., "Pixel-level deep segmentation: artificial intelligence quantifies muscle on computed tomography for body morphometric analysis," *Journal of Digital Imaging*, vol. 30, no. 4, pp. 487–498, 2017.

[25] S. Yeung, N. L. Downing, L. Fei-Fei, and A. Milstein, "Bedside computer vision — moving artificial intelligence from driver assistance to patient safety," *New England Journal of Medicine*, vol. 378, no. 14, pp. 1271–1273, 2018.