

Research Article

Reform and Intelligent Innovation Path of College Football Teaching and Training Based on Mixed Teaching Mode

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Computers and network information technology are changing our production and lifestyles and at the same time profoundly affecting the development of education. Higher education informatization focuses on the integration of information technology and higher education. It is necessary to comprehensively deepen education reform and innovate teaching methods and promote the overall improvement of education. This article aims to explore the innovative path of teaching reform based on college football training based on the current situation of college football teaching. Using literature research and questionnaire surveys, physical education teaching focuses on the unification of theory and practice. Both are indispensable. Mixed teaching is more in line with the teaching laws of physical education disciplines. It inherits the advantages of e-learning (i.e., the Internet online learning mechanism). Free from the constraints of a single online learning mode, this article designs a football training reform and innovative teaching experiment, using smart sensor technology to detect the body posture control of students participating in football teaching and training, and using questionnaires to track the nutritional adjustment of the students participating in the experiment. Through the football training scores and physical fitness index data of students in the teaching experiment, the application effect of football teaching and training reform in this research is analyzed. Experiments show that with a 95% confidence level, the football teaching and training reform program of this research can improve the football training effect of students. Colleges and universities currently pay more attention to football catching and offensive practice, especially the offensive practice accounts for 68.2%. Therefore, it has important practical value and theoretical significance to study the mixed teaching effect of using MOOC resources in football teaching. The use of blended teaching can cultivate students' autonomous learning ability, make students transform from passive learning to active learning, stimulate students' learning motivation, and enable students to have a strong interest in football.

1. Introduction

1.1. Background and Significance. Nowadays, the rapid development of network information technology is gradually changing people's living habits and learning methods. The widespread use of various electronic devices has integrated new learning methods such as multimedia teaching and online teaching into traditional classroom teaching. In this environment, a new teaching mode, that is, blended teaching, was born. With the rapid development of science and technology in today's society, information technology is flooding all corners of social development. People's lives

cannot be separated from information technology. The progress of society requires the scientific development of information technology. Mixed teaching is the teaching process that depends on the background of information technology. Through the integration of digital teaching mode (MOOC, flipped classroom, etc.) on the basis of traditional teaching mode, serves the development of education [1]. The digital technology used in hybrid teaching is mainly video editing technology, Internet technology, and so on to give full play to the advantages of classroom physical teaching, and use the network learning platform to achieve the purpose of students' independent learning and

collaborative learning. In the hybrid teaching mode, knowledge and skills can be disseminated through MOOC resource platform, network digital platform, mobile terminal platform, and conduct practical training offline to strengthen the mastery of knowledge and skills [2]. This experimental research is based on the premise of following the curriculum design, through the experimental research of MOOC and football teaching, to explore the application effect of mixed teaching in football teaching [3]. The practical research of the mixed teaching model based on MOOC resources in football teaching will help to simplify the football teaching process and reduce the teaching pressure of teachers. At the same time, it will help to improve the football teaching effect, enrich the football teaching methods, and provide the football teaching mode [4].

1.2. Related Research at Home and Abroad. According to the comparison of football technology, physical quality, interest and other data, the influence of blended teaching on the teaching effect of football teaching in colleges and universities are analyzed. Although there are many related researches on sports teaching at home and abroad, most of them stay on the theoretical level and have not been put into practice. Under the guidance of industry associations, Xiang established a master's studio in the school, and innovatively constructed a mixed practice teaching model of "research promotes learning" integrating teaching, training, and research and development. To a large extent, it can expand the scope of social and corporate services of the clothing and clothing design profession, improve the level of professional services, drive the development of professional construction, and then cultivate a large number of internationally competitive clothing design innovation talents [5]. Studies have shown that the combination of virtual reality technology and college physical exercise can avoid sports injuries, break restrictions, and improve teaching effects [6]. However, because virtual reality technology is a brand-new computer technology, its application in physical education and other fields is not mature yet and the cost is relatively high. Therefore, the physical training simulation system has not been applied to actual physical education training. Fan believes that physical training is of great help in improving people's physical fitness, and physical fitness can be achieved through physical exercise [7]. She proposed to incorporate multimedia teaching into dance, aerobics, and other physical education to enhance the attractiveness of the teaching classroom, mobilize students' interest in active training, and fully demonstrate the strong infectiousness and vitality of physical training [8]. However, the training of these courses is usually carried out by teachers. Students imitate training, and students have limited time in class, which leads to unsatisfactory learning effects. To this end, we propose blended teaching to reform it.

Sports teaching and training courses not only involve the influence of teaching methods and venues, but also nutrition regulation is an important factor. Therefore, many scholars and physical education workers have studied the reform and innovation of physical education training courses from the perspective of nutrition regulation. For example, Guskowska explored the relationship between nutrition regulation and willingness to receive physical training with age, physical parameters, choice of body image elements, training time, training times, and intensity [9]. She analyzed their nutritional intake and physical condition during training through 140 women aged 18 to 35 who had received 1 to 15 years of training in a fitness club [10]. The results showed that due to the imbalanced nutritional intake, women who are willing to stop fitness training exercise fewer times, participate in training sessions for shorter periods and lower intensity. Tymoshenko analyzed the literature sources of the professional language and culture of physical education teachers. She believes that the formation of professional language culture of physical education teachers in the future means the use of teaching methods for purposeful training [11]. The practice has proved that the application of language and culture courses for sports majors has promoted the mastery of high-level professional language and culture, and the introduction of professional language and culture formation programs in the education process stimulates the autonomy of future PE teachers in teaching [12]. However, such courses are time-consuming and therefore not popular in college physical education.

1.3. Innovations in This Article. In today's society, the vast majority of physical education teaching in ordinary colleges and universities is focused on teachers' teaching methods, and few teachers will take students as the leading role, and develop teaching methods according to the basic situation of students. For college students participating in football teaching and training, most of the students do not understand the kinematic principles of football training, so it is easy to use the wrong practice methods for football practice [13]. This article uses multimedia technology to show the correct and standardized football training methods and postures to college students, and proposes the application of virtual reality intelligent technology to let students feel the immersive virtual teaching experience of football training, thereby deepening students' knowledge of football training kinematics and arouse students' interest and enthusiasm for football training [14]. Especially in football training, such as the direction and angle of kicking, the trajectory of football, etc. are often unable to be accurately described in words, and physical education teachers are not always able to accurately and clearly impart this knowledge [15]. The media technology can be used to slow down the video for students to learn better, and it can also be combined with the teaching

experience of virtual reality to allow students to quickly understand and master this knowledge. The majority of students who are able to exercise as the motivation for football training accounted for 21.1%.

2. Physical Education and Training of College Football

2.1. Sports Mechanics in Football Training. In the sports training of college football, the knowledge of sports mechanics is very important for students to master the correct posture of football training and scientific and efficient training methods [16, 17]. Assuming that the radius of the football is r , the mass is m , the distance from the thigh to the toe point of contact with the football is d , the distance from the center of the football ball to the end of the heel is x , the speed before and after the football is kicked are v_0 and v_1 , respectively. The time interval until the football leaves the point of contact with the player's toe is t , the vertical force of the football on the toe is f , and the force of the thigh to the toe is F . Without the influence of gravity, football training can be obtained according to the momentum theorem. The kinematics formula is as follows:

$$f = \frac{m(v_0 + v_1)}{t}, \quad fx = I\alpha, \quad F + f = Ma. \quad (1)$$

In the sports mechanics formula shown above, I represents the moment of inertia of the football rotating around the center of the ball, α is the angular velocity of the football rotating around the center of the ball, and a is the acceleration of the displacement of the football center of mass. The motion of the center of mass of the particle system is the same as the motion of a particle located at the center of mass, the mass of the particle is equal to the total mass of the particle system, and the force on the particle is equal to all the external forces acting on the particle system move parallel to this point. In football training, the state after the football is kicked can also be analyzed and predicted based on the knowledge of sports mechanics. This is of great significance for athletes to deeply understand the kinematic principles of football practice and improve their competitive level. According to the law of motion of the center of mass, the calculation formula for the acceleration of the center of mass of the football can be obtained as follows:

$$a = (x - 2r - d)\alpha. \quad (2)$$

The calculation of the acceleration of the center of mass of the football can accurately determine the momentum and angular velocity when the football is kicked in the forward direction, thereby predicting the movement of the football after the kick is kicked, and helping the football player to effectively adjust the direction and body posture of kicking the football. According to the law of rotation, the above formulas (1) and (2) can be combined to obtain the calculation formula of the force F provided by the thigh to the toe kicking the football.

$$F = \frac{m(v_0 + v_1)}{t} \left(\frac{Mx(x - 2r - d)}{I} - 1 \right). \quad (3)$$

In daily football practice, players often encounter situations where the toe or the contact point of the ankle and the football is seriously deviated from the edge of the center of the ball. At this time, the reaction force generated by the impact of the football on the toe is almost perpendicular to the ankle and thigh [18, 19]. At this time, the force $F = 0$ from the ankle to the center of the football ball can be calculated to calculate the distance y from the center of the football ball to the foot receiving point. According to the knowledge of sports mechanics in football training, it can improve the physical fitness of college students and sports professional football players. The level of competition is important to help.

$$y = \frac{I}{M(x - 2r - d)}. \quad (4)$$

2.2. Body Posture Control in Football Training. Fall is the most common sports injury in sports training and daily life, and it ranks first in sports injuries in football training. There are many related studies on the causes of falls. The relatively early human fall prediction model is the mathematical prediction model between the slip resistance of the shoe upper and the actual fall of the British physicist Hansen in the 19th century [20, 21]. Its logistic regression model is as follows. p represents the probability of slipping, α_0 and α_1 represent the regression constants and coefficients of the mathematical model, and COF represents the safety threshold of the corresponding friction coefficient. This model can predict the probability of a human body slipping based on the friction factor of the human body slipping. In football training, athletes can take corresponding protective measures accordingly to reduce the probability of slipping.

$$p = \frac{\exp(\alpha_0 + \alpha_1 \text{COF})}{1 + \exp(\alpha_0 + \alpha_1 \text{COF})}. \quad (5)$$

In order to study the body posture control of college students in football training, this article combines the smart sensor technology to detect the body posture data of students in football training. In this article, a simulation recognition method based on particle filtering is adopted. According to the particle set collected and filtered in the particle filter, the posterior distribution is expressed by weighted summation, thereby changing the integral form into the summation form [22, 23], and its posterior distribution form is as follows, where $\{X_{0:t}|t = 1, \dots, n\}$ represents the particle set of random sample data collected from the particle filter, and $\delta(dX_{0:t})$ is the probability density function of the sample set. Because this distribution is obtained after sampling, it is called the posterior distribution.

$$\hat{p} = (X_{0:t}|Y_{1:t}) = \frac{1}{n} \sum_{i=1}^n \delta_{0:t}(dX_{0:t}). \quad (6)$$

Intelligent sensor monitoring technology is mainly based on the principle of particle filtering to identify and detect the body posture of target students in football training. The particle filter approximates the probability density function of the random variable of the system through discrete random sampling points, particles, and replaces the integration operation with the average value of the sample. According to the nature of the probability density function, the mathematical expectation $E[f_t(X_{0:t})]$ of the density function of the sample particle set f_t is calculated as follows.

$$E[f_t(X_{0:t})] = \int f_t(X_{0:t}) p(X_{0:t}|Y_{1:t}) dX_{0:t}. \quad (7)$$

For the collection of body posture data of college students, this article adopts the Bayesian importance sampling method, which can roughly represent its posterior probability distribution with a limited set of discrete sample particles. According to the law of large numbers, as the number of particles n continues to increase until it tends to infinity, its mathematically expected integral form $E[f_t(X_{0:t})]$ can be approximately transformed into a summation form $E[f_t(X_{0:t})]_{\text{sum}}$ through the normalized weight function $h_t(X_{0:t})$, which is the probability density of the sample set. The Bayesian mathematical expectation is calculated as follows [24, 25].

$$\begin{aligned} h_t(X_{0:t}) &= \frac{p(Y_{1:t}|X_{0:t})p(X_{0:t})}{p(X_{0:t}|Y_{1:t})}, \\ E[f_t(X_{0:t})]_{\text{sum}} &= \sum_{t=1}^n f_t(X_{0:t})h_t(X_{0:t}). \end{aligned} \quad (8)$$

The principle of this filter is to use computer software to calculate the maximum distance of the COP signal of the smart sensor in the front and back and left and right directions in the football training of students, 95% of the COP coverage area, and the average speed of COP signal transmission to evaluate the posture of college students' control ability. The calculation formula of the covariance S_{AB} of the distance between the COP signal of the smart sensor in the front-rear direction and the left-right direction is as follows, where $A(i)$ and $B(i)$ represent the distance of the COP signal in the front-rear direction and the left-right direction, respectively.

$$S_{AB} = \frac{1}{n} \sum_{i=1}^n A(i) * B(i). \quad (9)$$

By determining the distance of the COP signal of the smart sensor in the front and rear direction and the left and right direction, the instantaneous speed and average speed of the COP signal transmission can be obtained. According to the transmission speed and response time of the COP signal of the smart sensor, the time it takes for the student to complete a specific body posture can be estimated, thereby reflecting the difficulty of the student to complete these postures. These data and the evaluation standards of the

research related to the body posture control ability can roughly evaluate the students' body posture control ability in football training. The instantaneous speed $v(t)$ and average speed \bar{v} of COP (common on-chip processor) signal transmission are calculated as follows:

$$\begin{aligned} v(t) &= \frac{|d_{\text{cop}}(t+1) - d_{\text{cop}}(t)|}{T}, \\ \bar{v} &= \frac{1}{n-1} \sum_{i=1}^{n-1} v(t). \end{aligned} \quad (10)$$

2.3. Nutrition Control Tracking in Football Training. In order to study the nutrition regulation in high-efficiency football training of students, this article has carried out a follow-up investigation on the intake of the three major energy substances and main vitamins and mineral elements of college students. Table 1 shows the basic situation of high-efficiency students who voluntarily participate in the football training teaching reform experiment of this research.

According to the survey data, the correlation analysis between the nutrition regulation of college students and football training performance and physical health indicators is carried out. Here, Y represents the height, weight, and training results of college students participating in football training, x_i represents the intake of various nutrients by college students, t represents the athlete number, λ represents the height and weight growth of college students, and μ_i is the nutritional intake of college students. The correlation coefficient with height, weight, and changes in football training performance can also be called the sensitivity coefficient and ν represents the random error of the sample data.

$$\text{In}Y = \lambda + \mu_1 \text{In}x_t + \mu_2 \text{In}x_{t-1} + \mu_3 \text{In}x_{t-2} + \mu_4 \text{In}Y_{t-1} + \mu_5 \text{In}Y_{t-2} + \nu. \quad (11)$$

The degree of linear correlation between the nutrition regulation of college students participating in football training and the training effect reflected by the football training performance can be tested with the correlation coefficient ρ . When $0 < \rho < 1$, it shows that there is a positive correlation between nutrition regulation and the improvement of football training effect relationship, when $\rho = 1$, the two are completely linearly correlated, when $\rho = 0$, the two are completely uncorrelated, on the contrary, $\rho < 0$, the two are negatively correlated, the correlation analysis calculation formula is as follows.

$$\rho = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 \cdot (y_i - \bar{y})^2}}. \quad (12)$$

In order to more accurately analyze the impact of nutrition regulation on the training effect of football training, this article further introduces the standard deviation and

TABLE 1: Basic situation of football training college students.

Group	Number	Age	Height (cm)	Weight (kg)
Experimental	30	22.13 ± 2.36	168.22 ± 6.26	66.54 ± 12.34
Control	30	21.87 ± 2.98	169.12 ± 5.53	67.67 ± 10.76
Total	60	21.97 ± 3.14	168.74 ± 6.14	66.83 ± 11.59

coefficient of variation based on the correlation analysis calculation to analyze the nutritional intake of college students, football training performance, and physical index data. The standard deviation reflects the dispersion and average of the data. The formula for calculating the standard deviation is as follows, where x_i and \bar{x} are the sample data and the sample mean, and n is the model capacity.

$$\sigma = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}. \quad (13)$$

Since the short-term nutrition regulation effect is not significant in the football training process, this article counts the nutrition intake of students in multiple months with the help of football teachers and diet managers. Therefore, this article uses the standard deviation rate, that is, the coefficient of variation CV, to analyze and measure the degree of fluctuation of the nutritional intake data around the mean. The calculation formula is as follows.

$$CV = \frac{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 / n}}{\bar{x}}. \quad (14)$$

2.4. Mixed Teaching Mode. Blended teaching (B-leaning) originated in the United States. After continuous development and improvement, it has now been used in corporate training, school education, and other fields. As a teaching mode, blended teaching combines teaching practice and rational use of teaching resources to assist teaching. For example, in the football course, the pass-and-stop buckle technique is taught. Fixed-frame explanations, and repeated a large number of explanations and demonstrations, require very high physical fitness for teachers. Conventional course teaching is mostly limited to demonstrations and explanations in the classroom, and it is difficult to freeze-frame explanations for the details of the actions, only limited to the description of the language; and use blended teaching to assist the teaching of its actions, and through the rational use of information technology to edit the teaching action videos, to achieve the purpose of highlighting the important and difficult points of the action. The so-called B-learning is based on conventional teaching, applying the advantages of online learning to conventional teaching, realizing the integration of information technology, and conventional teaching methods. Online learning has the characteristics of real-time and selectivity, but it lacks supervision and guidance, and has certain uncontrollability; while the conventional teaching methods are relatively simple, but face-to-face teaching virtually strengthens the emotional cultivation between teachers and students, and psychological communication, through the integration of the two, give

play to their respective advantages, realize the supervision and guidance of teaching, and effectively mobilize students' learning enthusiasm and initiative.

In summary, it can be concluded that blended teaching integrates the advantages of traditional learning methods and network learning (e-learning), and distributes scientifically and reasonably, so as to achieve the purpose of improving teaching effects and reducing teaching costs, and it is more helpful to give full play to teachers. The formation of a teaching model leads students as the main body of learning.

3. Reform and Innovation Experiment of Football Teaching and Training

3.1. Research Object. The research object of this article is the analysis of the teaching reform and innovation direction of college football training. According to the application of multimedia technology and virtual reality intelligence, this article proposes a combination of multimedia technology and virtual reality intelligence assistance for the current problems of old and backward football teaching and training venues in colleges and universities, insufficient professionalism of teachers, low student training enthusiasm, and lack of systematic training plans. Reform and innovation of football teaching and training. In order to explore the application effect of the football training teaching reform and innovation plan in this study. This experiment observes and detects the nutritional intake, physical condition, and football training performance of these students, and uses intelligent sensors to detect the experimental data of these students' body posture control ability and the number of falls during training. Finally, statistical methods are used to summarize and analyze the experimental data obtained with the help of computer software, so as to discuss the application effect of the football teaching reform method in this research.

3.2. Experimental Design of Football Training Teaching Reform. The purpose of this experiment is to explore the reform and innovation path of football teaching and training in colleges and universities, and to analyze the practical effect of the method of football teaching reform in this research. The experiment is mainly divided into the following steps. The first step is to understand the current problems in football teaching and training in colleges and universities through literature research and questionnaire investigation and propose targeted reform measures. The second step is to deeply understand the principles of kinematics in football training and the application of multimedia and virtual reality intelligence technologies, and apply these technologies to the

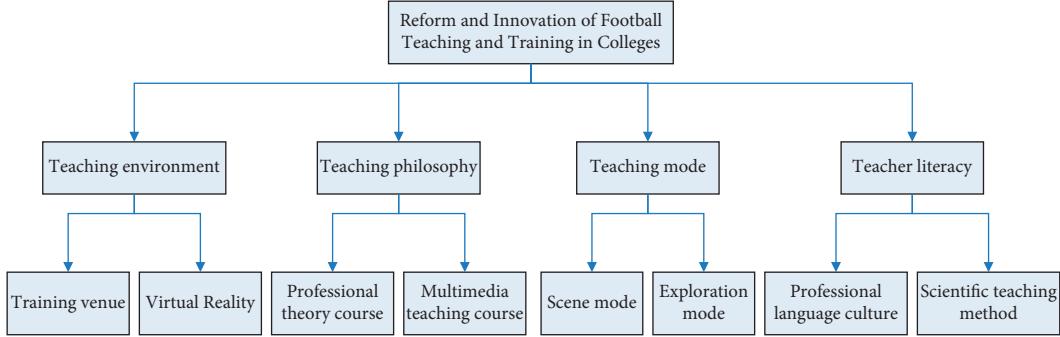


FIGURE 1: Research framework of reform and innovation path of college football training.

reform plan of football teaching and training. The third step is to divide the college students who voluntarily participate in this experiment into an experimental group and a control group. They use innovative teaching methods and traditional training methods for football teaching and training, and observe and record the nutritional regulation, physical condition, and physical condition of these students, football training results, etc. The fourth step is to use sports statistics and computer-assisted processing to analyze these data, discuss the application effects and shortcomings of the football training teaching reform methods in this study, and propose future research prospects. The main framework of this research is shown in Figure 1.

3.3. Regression Analysis of Experimental Error and Reliability Estimation. In the process of analyzing changes in the nutritional intake and physical index data of college students participating in football training, statistical analysis of the data is required, a large number of equations may need to be combined, and other factors may also be considered in many cases, resulting in a variety of hypotheses. In order to avoid calculation complexity, this article adopts regression analysis method for these data and establishes the following vector regression equation:

$$T_t = \lambda + \sum_{i=1}^n \mu_i R_{t-i} + \sum_{i=1}^n \nu_i S_{t-i} + \theta_t. \quad (15)$$

This can minimize the number of simultaneous hypothetical equations, and then estimate through the least squares method to simplify the process of calculation and analysis. In order to avoid the contingency of the nutritional control data obtained from the experiment on the football training of college students, this article uses the reliability estimation method to estimate the consistency R_{tt} of the physical index data of the same student under the same nutritional intake in the same time interval.

$$R_{tt} = \frac{(\sum x_1 x_2 / n) - \bar{x}_1 \bar{x}_2}{\sqrt{\sum x_{12} - (\sum x_1)^2 / n} * \sqrt{\sum x_{12} - (\sum x_2)^2 / n}}. \quad (16)$$

TABLE 2: Investigation of football teaching practice in colleges and universities.

Football training	Number	Proportion (%)	Average	Sort
Warm-up training	71	39.6	68.64	5
Passing practice	94	46.9	82.37	3
Catching practice	102	58.7	94.86	2
Group practice	68	36.4	60.24	6
Offensive practice	124	68.2	98.37	1
Defense practice	83	41.8	73.86	4

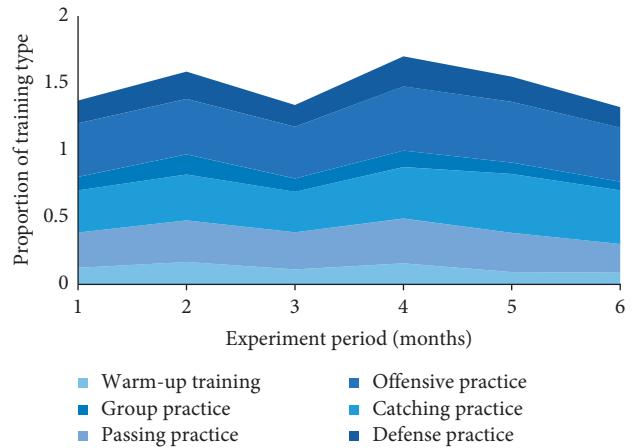


FIGURE 2: College football training content and proportion of courses.

4. Discussion on the Reform and Innovation Experiment of Football Teaching and Training

4.1. Current Situation of Football Teaching and Training in Colleges. Before carrying out the reform and innovation experiment of football teaching and training, this article investigates and counts some basic situations of football training in colleges and universities. It mainly understand the current situation of football training in colleges and universities from the warm-up training, passing practice, receiving practice, group practice, offensive practice, and

TABLE 3: Student football skills scores before the experiment.

Grades	Bump	Dribble	Stop	Pass	Catch	Shoot	Defend
A	81.5	83.4	68.5	72.8	88.6	91.5	66.8
B	74.8	78.5	61.6	63.5	81.3	79.5	71.4
C	79.6	85.6	71.9	78.8	84.7	93.8	62.9
D	84.3	75.6	85.9	76.3	79.2	82.7	73.8
E	76.6	87.6	69.8	71.4	82.5	76.9	64.5

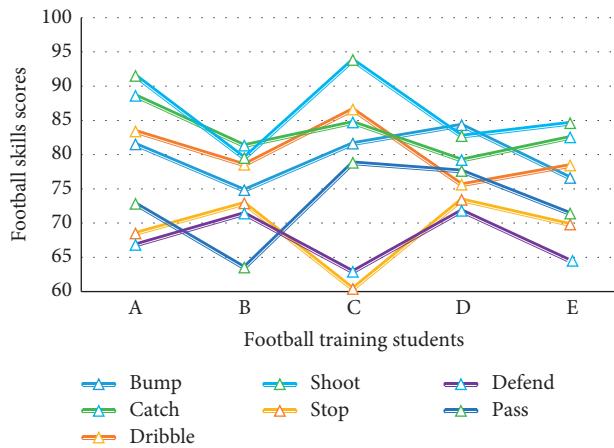


FIGURE 3: Football skill scores of some students before the experiment.

defense practice of football training. As shown in Table 2, colleges and universities currently pay more attention to football catching and offensive practice, especially the offensive practice accounts for 68.2%, but lacks attention to defense and teamwork practice.

This article also counts the proportions of various football practice contents in the whole football training process in 6 months according to the different practice types of football training. As shown in Figure 2, in college football training, the most common type of training content is offensive practice, followed by catching practice, which is consistent with the results of the above survey. Through interviews and investigations, it is found that the reason for the emphasis on offensive practice in college football training is that college students prefer offensive practice rather than practice defense. They think that they are not professional football players, and they do not need to take into account defensive practice and group practice, but should be personalized.

4.2. Football Training Performance Level of College Students before the Experiment. In order to compare and analyze the influence of the football teaching and training reform and innovation plan of this study on the football skill level of college students through experiments, this article investigates the football skill level of college students who participated in this experiment before the experiment. As shown in Table 3, It can be seen that most of the students have relatively high scores in receiving and shooting,

TABLE 4: The purpose of football training for teachers and students in colleges and universities.

Purpose	A	B	C	D	E	F	G	H
Teachers	98	91	54	47	62	18	77	25
Percentage	38.9	36.7	19.2	16.9	23.2	7.2	29.7	9.8
Students	53	14	39	37	26	18	39	35
Percentage	21.1	4.9	15.2	14.5	9.6	6.8	14.7	13.9

which also reflects the bias toward receiving and offensive practice in the training process.

This article investigates the football skill level of 60 students participating in the experimental football teaching and training, and prepares to compare the changes in the football skills of these students after the experiment. This article intercepts the football skills scores of some students and draws them into a line chart as shown in Figure 3. It can be seen from the figure that two students, A and C, have the best scores, but they are negligent in stopping and defending. And two students, B and D, have the most balanced results, with equal skill levels.

4.3. Investigation on the Purpose and Will of College Teachers and Students for Football Training. Studies have found that goals and interests are important inducing factors to improve the efficiency and quality of learning. Therefore, this article investigates the views of teachers and students of colleges and universities on the sport of football training, as well as their purpose and willingness to carry out football training. As shown in Table 4, the main purpose of college teachers and students for football practice is to exercise, improve frustration ability, cultivate team spirit, curiosity about football training, interest in football course characteristics, happy learning mode, and after football training. To be touched, to make friends, and so on, in the table, alphabetical numbers A to H are used to indicate these types of purposes.

As shown in Figure 4, from the survey of the motivation of teachers and students for football teaching and training, it can be seen that the majority of students who are able to exercise as the motivation of football training accounted for 21.1%. Touch and curiosity about football training accounted for 15.2%, 14.7%, and 14.5%, respectively. The purpose of participating in football training is to make friends. The characteristics of football courses arouse interest in students accounted for 13.9% and 9.6%, respectively, and they think football training courses. The students who are happy are the least, accounting for only 4.9%.

4.4. College Teachers and Students Believe That the Factors Affecting Football Training. In order to understand the views of college teachers and students on the factors affecting the development of football teaching and training, this article conducted a questionnaire survey on the factors that college teachers and students think affect the development of football teaching and training. As shown in Table 5, college teachers and students believe that the main factors affecting football teaching and training are sports promotion,

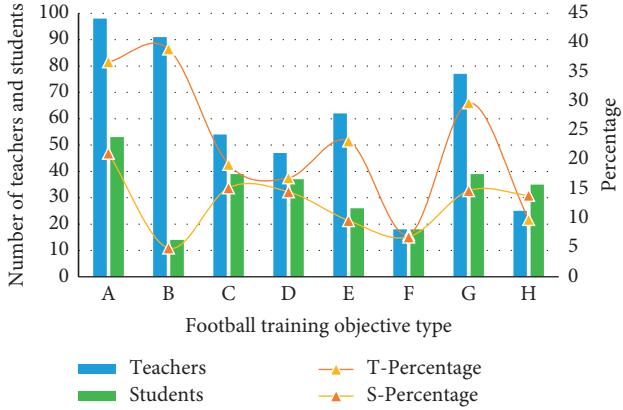


FIGURE 4: Football training purpose of college teachers and students.

TABLE 5: Factors that college teachers and students think affect football teaching and training.

Purpose	A	B	C	D	E	F	G	H
Teachers	14	17	15	13	16	10	12	9
Percentage	57.2	74.7	69.4	55.6	71.4	28.4	47.9	24.3
Students	62	35	64	89	97	19	51	22
Percentage	24.3	13.4	25.2	47.6	58.7	10.3	19.5	9.1

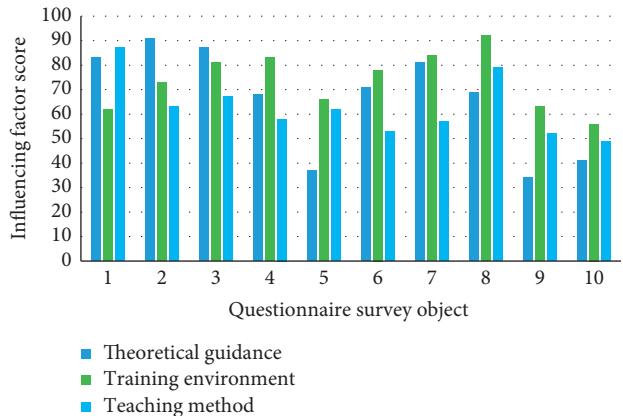


FIGURE 5: Investigation of main factors affecting football teaching and training.

leadership support, teacher strength, capital investment, venue equipment, theoretical system, safety measures, and teaching methods. In the table, the letter numbers from A to H are used to indicate these influencing factors.

Based on the above survey of factors that teachers and students think restrict the development of football teaching and training, this article classifies and analyzes these factors. These factors affecting college football teaching and training are mainly divided into three types: theoretical guidance, training environment, and teaching methods. This article rescores based on these three types of factors, the scoring situation after statistics is shown in Figure 5.

TABLE 6: Football training skill scores of college students.

Evaluation	TG	TE	TM	Comprehensive	Before	After
A	36.27	31.38	24.58	15.41	18.97	21.98
B	33.74	15.14	25.62	19.19	21.38	29.37
C	27.84	39.29	21.37	35.73	31.64	26.64
D	41.28	44.26	32.39	36.59	48.36	39.32
E	64.66	59.98	41.76	48.36	56.13	37.13
F	58.47	54.14	42.64	66.64	62.98	47.96

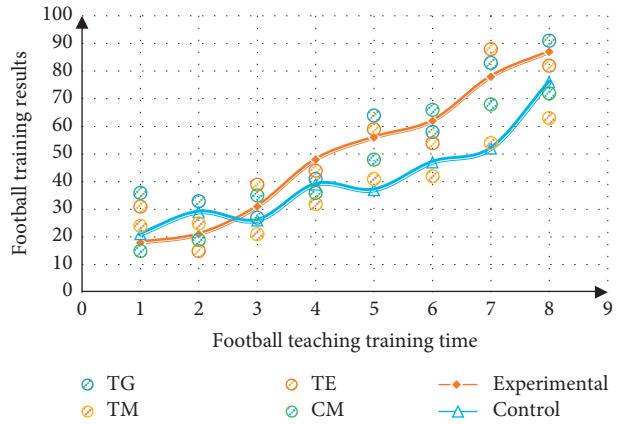


FIGURE 6: Evaluation of football teaching and training reform methods.

4.5. Evaluation of the Method of Football Teaching and Training Reform in this Study. Based on the comparative analysis of students' football skills before and after the teaching experiment, this article evaluates the effects of the reform and innovative methods of football teaching and training in this research. As shown in Table 6, the evaluation of the football teaching and training reform methods of this study is mainly based on the football skill performance of the experimental group, the football skill performance of the real control group, and the attitudes of teachers and students to the football training reform method of this research. Among them, TG, TE, TM, and CM, respectively, represent the students' theoretical scores, training scores, competition scores, and comprehensive scores.

After understanding the current situation of football teaching and training in colleges and universities and the cognition and attitudes of teachers and students to football training and analyzing the factors that affect the development of football teaching and training, this article analyzes the application effect of football teaching and training reform methods. Taking the students who participated in football teaching and training in this experiment as the research object, their various football skills during the training process are shown in Figure 6.

5. Conclusions

In the 6-month research experiment on the reform and innovation path of college football teaching and training, this article draws the following conclusions based on the

football teaching and training situation of college students. First, the traditional teaching methods of football teaching and training in colleges and universities mainly have problems such as backward training venues, single teaching methods, lack of teaching concepts, insufficient professionalism of teachers, and low student training enthusiasm. Second, college students and some football teachers have insufficient knowledge of the kinematics of football training, so they often fall into the wrong training methods. Third, the students' low interest in football training is mainly due to the lack of professionalism of some football teachers themselves and the lack of attention to football teaching. They cannot provide a high-quality teaching environment and enhance the fun of football teaching. The teaching methods of blended teaching include the exploration of the combination of mobile learning and blended learning and the research on blended teaching and teaching modes based on various network teaching platforms.

In response to the above problems found in football teaching and training in colleges and universities, this article proposes the following improvement measures from the perspective of multimedia teaching and virtual reality intelligent applications. First, increase capital investment in the construction of sports facilities, build a safe and complete training venue, and create a virtual teaching environment for football training through the intelligent application of virtual reality. Then, the teaching method is reformed, combined with multimedia teaching and football training theory courses, so that students can deeply understand and think about the kinematic principles of football training and formulate correct and adapted football training methods. Finally, physical education teachers can improve their verbal expression skills in football teaching by learning professional language and culture courses for football training, thereby enhancing their professional qualities. Traditional classroom teaching is a teacher-based teaching activity that imparts knowledge and skills, and students passively accept the knowledge and skills taught by teachers. At present, the main method of physical education in colleges and universities is still the traditional teaching mode.

Cultivating teachers' comprehensive quality is not only "offline" teaching ability but also the implementation of online teaching related to the ability to work. Students use the MOOC online learning platform to effectively integrate the off-class learning time for effective learning. Through the online learning platform, they can learn about the students' off-class homework and preclass teaching content preview in a timely manner, form effective supervision of student learning, and improve teaching efficiency. Blended teaching as a supplement to traditional teaching methods has become a general trend. It has expanded teachers' teaching methods. In the context of the information age, the use of network online learning platforms to realize the operability of teaching content, the teaching content is edited and uploaded to the network learning platform to simplify classroom teaching procedures and tasks. However, due to individual differences among students, there are very few students who are accustomed to conventional football teaching methods, so it is necessary to look at the use of

mixed teaching methods more rationally and dialectically. In the future teaching, teachers should study and observe more, lead by example, and set an example among students, so that more students can fall in love with sports and work hard with the goal of falling in love with sports.

Data Availability

The datasets used and/or analyzed during the current study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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References

- [1] J. M. Lawler, D. A. Rodriguez, and J. M. Hord, "Mitochondria in the middle: exercise preconditioning protection of striated muscle," *The Journal of Physiology*, vol. 594, no. 18, pp. 5161–5183, 2016.
- [2] R. E. Vetter, H. Yu, and A. K. Foose, "Effects of moderators on physical training programs: a bayesian approach," *The Journal of Strength & Conditioning Research*, vol. 31, no. 7, pp. 1868–1878, 2017.
- [3] S. Maruyama, "A study of the teaching methods of vocal training: at the college of education," *Angewandte Chemie*, vol. 127, no. 17, pp. 308–314, 2015.
- [4] H. F. Zhang, J. L. Liao, M. Ji et al., "Effect of simulating leg length inequality on spinal and pelvic posture in the elderly," *Zhonghua Yixue Zazhi*, vol. 97, no. 39, pp. 3062–3067, 2017.
- [5] G. Xiang, "Research and practice of innovative research practice teaching mode based on master studio," *International Journal of Social Science and Education Research*, vol. 2, no. 7, pp. 1–8, 2019.
- [6] R. Chiba, K. Takakusaki, J. Ota, A. Yozu, and N. Haga, "Human upright posture control models based on multi-sensory inputs; in fast and slow dynamics," *Neuroscience Research*, vol. 104, no. 6, pp. 96–104, 2016.
- [7] B. Fan, "On the teaching reform of physical training course from micro course perspective," *Journal of Hunan Institute of technology*, vol. 18, no. 2, pp. 86–88, 2018.
- [8] M. P. E. Morales, R. A. Avilla, and A. A. Espinosa, "Does gender inequality influence interest in pursuing a career in science or mathematics teaching?" *Issues in Educational Research*, vol. 26, no. 1, pp. 65–81, 2016.
- [9] M. Guszkowska and S. Mosur-Kaluža, "Determinants of women's willingness to continue fitness training in spite of health risks," *Biomedical Human Kinetics*, vol. 7, no. 1, pp. 8–14, 2015.
- [10] A. P. Jha, A. B. Morrison, S. C. Parker, and E. A. Stanley, "Practice is protective: mindfulness training promotes cognitive resilience in high-stress cohorts," *Mindfulness*, vol. 8, no. 1, pp. 46–58, 2017.
- [11] O. Tymoshenko, "Professional speech culture in teaching activities of the physical training teacher," *Path of Science*, vol. 3, no. 4, pp. 1–3, 2017.

- [12] J. W. Seo, D. H. Kim, S. T. Yang, D. W. Kang, J. S. Choi, and G. R. Tack, "Comparison of joint kinematics and pedaling force in the young and the elderly," *Journal of Physical Therapy Science*, vol. 28, no. 8, pp. 2245–2248, 2016.
- [13] L. Wang, W. Feng, L. Jia et al., "Emotional processing of winning and losing facial expression and body posture," *Acta Psychologica Sinica*, vol. 50, no. 8, pp. 892–904, 2018.
- [14] Z. Saenz-de-Urturi and B. Garcia-Zapirain Soto, "Kinect-based virtual game for the elderly that detects incorrect body postures in real time," *Sensors*, vol. 16, no. 5, pp. 704–712, 2016.
- [15] A. Doulah, X. Shen, and E. Sazonov, "Early detection of the initiation of sit-to-stand posture transitions using orthosis-mounted sensors," *Sensors*, vol. 17, no. 12, pp. 2712–3316, 2017.
- [16] E. Park, H. Reimann, and G. Schöner, "Coordination of muscle torques stabilizes upright standing posture: an UCM analysis," *Experimental Brain Research*, vol. 234, no. 6, pp. 1757–1767, 2016.
- [17] S. Pritzker, M. Springer, and A. McBride, "Learning to vote: informing political participation among college students," *Journal of Community Engagement and Scholarship*, vol. 8, no. 1, pp. 8–11, 2015.
- [18] K. D. Spoor and H. Madanat, "Relationship between body image discrepancy and intuitive eating," *The International Quarterly of Community Health Education*, vol. 36, no. 3, pp. 189–197, 2016.
- [19] A. J. Osama and A. Shehab, "Psychological wellbeing and biochemical modulation in response to weight loss in obese type 2 diabetes patients," *African Health Sciences*, vol. 15, no. 2, pp. 503–511, 2015.
- [20] K. L. Rand, D. A. Banno, A. M. Shea, and L. D. Cripe, "Life and treatment goals of patients with advanced, incurable cancer," *Supportive Care in Cancer*, vol. 24, no. 7, pp. 2953–2962, 2016.
- [21] J. Zhu, R. H. Weisberg, L. Zheng, and S. Han, "Influences of channel deepening and widening on the tidal and nontidal circulations of tampa bay," *Estuaries and Coasts*, vol. 38, no. 1, pp. 132–150, 2015.
- [22] C. Sas and R. Chopra, "MeditAid: a wearable adaptive neurofeedback-based system for training mindfulness state," *Personal and Ubiquitous Computing*, vol. 19, no. 7, pp. 1169–1182, 2015.
- [23] F. Venetsanou and A. Kambas, "Physical activity promotion in Greek preschools: the gap between theory and practice," *Early Childhood Education Journal*, vol. 45, no. 3, pp. 437–444, 2017.
- [24] M. S. Y. Thong, M. A. G. Sprangers, J. A. Sloan, D. L. Patrick, P. Yang, and C. J. F. van Noorden, "Genetic variations underlying self-reported physical functioning: a review," *Quality of Life Research*, vol. 24, no. 5, pp. 1163–1177, 2015.
- [25] N. Destan and C. M. Roebers, "What are the metacognitive costs of young children's overconfidence?" *Metacognition and Learning*, vol. 10, no. 3, pp. 347–374, 2015.