

# Reform of Football Training Professional Courses Based on Federated Learning under the “Internet+” Model

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## Abstract

Federated learning can enable mobile devices to train a shared prediction model cooperatively, and save all training data on the device, to decouple machine learning and cloud storage data. This goes beyond forecasting on mobile devices using local models. Football training courses are the main subject of the school and an indispensable part of the physical education teaching process. The reform of the football teaching course also needs constant reform and innovation. China's football curriculum education is mainly from the perspective of competitive sports, focusing on the teaching of technical movements and rules of football, which hinders the long-term development of football education in China. In order to solve this problem, this paper takes the special football training courses in colleges and universities as the research object, and analyzes the present situation of campus football courses, the formulation of physical education teaching objectives, physical education teaching methods, the degree of connection between physical education content and physical fitness improvement, and the effect of physical education evaluation methods. Starting with the information-based football training special courses in the era of “internet plus”, this paper summarizes the reform methods of physical education courses and explores the information-based football teaching reform mode in the era of “internet plus”. The results show that the current education system cannot well meet the social needs of professional talents cultivated by Chinese colleges and universities. It is suggested that the football education mode of Internet + sports is a key measure to change the traditional physical education concept and education mode and promote the sustainable development of sports; the deep integration of “internet plus” and football education has a strong impact on the traditional course teaching in colleges and universities. Giving full play to the advantages of Internet resources in football course teaching and taking advantage of the convenience of mobile Internet terminals can effectively promote the informatization and intelligent development of football course teaching, effectively improve teaching efficiency, enhance students' acceptance and improve the matching of majors with the development of the times. The goal of physical education is reasonable, the teaching methods are diversified, the teaching contents are scientific, and the evaluation of physical education is reasonable. The research results have laid a solid theoretical foundation and theoretical guiding significance for the development of “internet plus” physical education curriculum reform. The reform and development of professional football training courses based on federated learning under the “Internet+” model will help to further improve the efficiency and quality of football training and will also have a positive significance in promoting the curriculum reform in colleges and universities.

## Keywords

Intelligent reflecting surface techniques, Internet plus, Football, Special courses, Curriculum reform, Federated learning\

## Introduction

Federated learning can enable mobile devices to train a shared prediction model cooperatively, and save all training data on the device, to decouple machine learning and cloud storage data. This goes beyond forecasting on mobile devices using local models. With the rapid development of information technology, great changes have taken place in human society, affecting both study and life, and education and teaching can't be avoided. With the continuous improvement of higher education concepts and the integration of Internet technology and curriculum teaching, it has not only promoted the construction of educational informatization but also created a new situation of scientific education [1,2]. The convenience, flexibility and effectiveness of teaching results and teaching process have also been highly recognized by society [3]. In the face of the rising Internet teaching, the relevant national education departments have introduced various educational reform policies, attached great importance to the construction and development of educational informatization, and quickly promoted the network technology into the classroom, so that students' ability to raise, analyze and solve problems and self-study ability can be continuously improved, and teachers' technical level can be continuously improved, teaching methods can be improved, and educational concepts can be re-taught [4-6]. As a highland of education, higher education continuously cultivates professional talents for the country, so it is imperative to reform and innovate the football training curriculum. The integration of information technology and education has become the mainstream trend of teaching reform [7-9]. The Ministry of Education has repeatedly stressed that it is necessary to give full play to the advantages of Internet technology, lead the comprehensive education reform, and deepen the popularization of online learning space [10]. Under the background of the Internet age, students can use the Internet to study anytime and anywhere, which can greatly meet diverse learning needs. At the same time, teachers can also use the network to carry out

teaching, keep abreast of students' learning situation, break through the time and space constraints, ensure the teaching progress, broaden students' horizons and stimulate students' interest in learning. However, it is a great challenge to introduce "internet plus" into the teaching of special courses of football training and construct a distinctive teaching mode [11-13].

"Internet Plus" is an application that provides convenient production and services for all departments through the Internet, big data, cloud computing and other science and technology. Through the continuous mutual development of Internet + technology, a new "Internet +" environment has been constructed. Some researchers think that the Internet + is based on the path of the Internet platform support, realize the integration of all walks of life, can not only save costs, and can improve the efficiency of production, promote resource sharing, to achieve industrial upgrading, and can continuously extends new business, new model and new industry, establish each other industry network, forming a new pattern of industry.

With the application of internet plus in the teaching reform, the campus football curriculum has undergone a major reform. Some researchers have pointed out that with the deepening of the teaching reform of football major in China, campus football, as the latest policy, has achieved good results, combining campus football with football, and promoting the development of campus football through the popularization of football, so as to stimulate students' interest in football training courses and establish long-term football value [14-16]. Some researchers have pointed out that football is the main sport in college physical education departments, and the implementation of campus football policy has made football more concerned [17]. The reform of football teaching in college physical education departments is the most important thing. Through physical education class, extracurricular activities and leisure time, campus

football activities and competitions are organized, and the teaching syllabus and teaching methods of campus football activities are reformed [18]. Some researchers have suggested that the teaching reform of football should meet the needs of the development of campus football, conform to the needs of the times, and make students participate in campus football by making a scientific and reasonable football syllabus, with students as the main body and the campus as the carrier, so that campus football can be carried out smoothly [19]. Some researchers have promoted football activities to reform football teaching reform, mainly by innovating teaching ideas and teaching methods, enriching the teaching content of football class, promoting the development of campus football and improving the teaching reform [20]. Some researchers believe that in the process of deepening education reform, colleges and universities should not only pay attention to training students to become professionals in physical education but also combine with social development to meet the current social demand for physical education, and train students to become compound professionals in physical education. Under the “internet plus” environment, students can choose their favorite physical education courses and study independently in any place in their spare time by means of the terminal media of the network, thus truly embodying the teaching of “taking students as the center of gravity”.

The reform and development of professional football training courses based on joint learning under the “Internet+” model will help to further improve the efficiency and quality of football training and will also have a positive significance in promoting the curriculum reform in colleges and universities. The effective integration of “internet plus” and football training special course education has also formed a channel between the supply and demand of physical education courses in colleges and universities, making it possible for the seamless connection between the supply side and the demand side, ensuring that students’ demands for

personalized and customized physical education courses are effectively responded, and promoting the transformation of traditional education mode. Taking the special football training courses in colleges and universities as the research object, this paper analyzes the present situation of campus football courses, the establishment of physical education teaching objectives, physical education teaching methods, the docking degree between physical education content and physical fitness improvement, and the effect of physical education evaluation methods, etc., and explores the information-based football teaching curriculum reform mode under the background of “internet plus” era, providing theoretical guidance for the development of physical education curriculum reform in “internet plus”.

### **Current situation and existing problems of special courses of football training**

#### ***Current situation of special courses for football training***

Through the investigation of football courses in ten physical education departments of colleges and universities, it is found that all ten physical education departments have football majors, and only a few students of general football majors teach boys and girls in separate classes. Due to the physical conditions of male and female students, it is decided that the mixed classes of male and female students will be held in football teaching, which will enable male students to drive female students to improve their learning efficiency and teaching quality and will also be beneficial to the achievement of football teaching effect and goal.

Through the investigation of football courses in physical education departments, Table 1 gives the questionnaire of football courses in the semester. It can be seen that: most schools arrange football courses in the second, third and fourth semesters, but no colleges offer football courses in the fifth semester. The main reason is that most students don’t know football, either theoretically or tactically. Through one year’s study and exercise, students can

improve their physical fitness. To get a preliminary understanding of football-related theoretical knowledge, at the same time, to cultivate students' interest in football, to tap their own potential in football, and to carry out targeted training and exercise for students, to give them a huge

development space. If the course is arranged in the fifth semester, students' learning time will be shortened due to various factors, which are not conducive to the development of students' technical and tactical level and specialized ability.

Table 1. Questionnaire for the football class opening semester.

Start time	First semester	Second term	Third semester	The fourth semester	The fifth semester
Term start (institute)	1	3	3	3	0

Table 2 shows the class hours of football classes, and the syllabus of football majors in each school has no clear regulations regarding the class hours. At present, most students will work as teachers and coaches after graduation, but the incomplete and meticulous schedule of class hours can't meet the needs of society. At present, the teaching hours of the football course are 54-58 hours, so students can have a basic understanding of football, but can't

achieve the goal of improving students' football skills and tactics, knowledge and theoretical basis. As for the number of football lessons arranged, we should pay attention to the needs of society. Some colleges and departments featuring football should effectively meet the strengthening of students' abilities in football, so that students can be competent for the profession of teachers in the future.

Table 2. Questionnaire on football class opening hours.

Class hours	48	54	58	64	72
Number of schools (institutes)	1	3	4	1	1

### *The necessity of special courses in football training*

Under the background of quality education, society's requirements for talents have changed, and it is particularly important to pay more attention to talents' ability and accomplishment, and to strengthen the cultivation of talents' core accomplishment. However, at present, under the influence of traditional teaching concepts, many colleges and universities don't attach importance to football courses, and more emphasis is placed on professional skills and cultural knowledge courses, which are very unfavorable to students' all-round development. To better meet the requirements of quality education at present, it is necessary for college football teaching to cultivate sports talents. Traditional football teaching philosophy is relatively backward, but traditional football teaching pays too much attention to students' theoretical knowledge, neglects students' sports

ability, affects the improvement of students' sports ability, and is not conducive to students' all-round development. At the same time, colleges and universities pay too much attention to theoretical knowledge study, which is not conducive to students' future career development. It is very meaningful to reform the current football teaching, and colleges and universities need to pay more attention to it. Football course teaching also plays a positive role in the cultivation of students' interests. In actual teaching, it actively demands the development of football teaching market for students. Teaching the reform of college football courses is also in line with the requirements of market development.

With the arrival of the era of knowledge economy, the employment pressure of students is gradually increasing, and society has higher requirements for talents. At present, the positions related to football require students not only to have a solid theoretical foundation, but also to have a strong practical level.

However, the teaching of students mainly focuses on the teaching of students' basic cultural knowledge. In this case, the students cultivated by colleges and universities cannot meet the requirements of the social market, and the teaching reform of football courses is also in line with the requirements of market development.

#### ***Main problems of special courses in football training***

Teaching content emphasizes practice over theory. Football courses have strong practicality, mostly outdoor teaching, and relatively few theoretical courses. However, in actual teaching, football pays more attention to the improvement of students' physical quality and sports ability. In class, it mainly leads students to carry out various sports, aiming at enabling students to master basic sports skills, neglecting the explanation of theoretical knowledge, which leads to students being in a passive state of physical exercise and weak learning objectives. In the long run, the football teaching content in colleges and universities focuses on the essentials and basic skills of sports events, and students do not have the awareness of lifelong physical exercise, nor can they internalize the spirit of competitive sports, which has a great impact on the teaching effect of physical education courses. At the same time, students' learning without understanding the spirit of sports will also lead to students' lack of interest and irregular movements, and the effectiveness of physical education teaching will be greatly reduced.

The teaching form is too single. In actual teaching, most college football courses still follow the traditional methods, mainly focusing on action explanation, demonstration, error correction, etc., which is far behind the requirements of contemporary physical education. The reform of teaching form has always been the focus of football curriculum reform. Under the constraint of traditional teaching environment, it is difficult to realize information-based teaching in the actual outdoor teaching scene. In the new era, football teaching environment is still dominated by

traditional teaching. Although teacher demonstration helps to strengthen students' understanding and memory, and enhance the two-way interaction between teachers and students, football teaching is one-to-many. During teaching, teachers can only select universal questions to strengthen teaching, and one-to-one precise teaching cannot be realized. In the long run, the single teaching method has greatly weakened students' enthusiasm for participation, and some students' irregular actions can't be guided in time, thus killing students' interest in football. At the same time, football action needs to be completed instantly, with strong consistency and complicated action, so teachers can't demonstrate to students one by one, which leads to students' inability to master the essentials of action.

The management of football teaching lags. Football teaching in colleges and universities is not only a single classroom teaching, but also includes homework, health test, physical intelligence management and many other contents. In the new era, college football courses should not only shoulder the important task of improving students' physical quality but also take the initiative to inherit the sports spirit and provide sports guidance, to cultivate a group of compound talents with excellent physical quality and all-round development of morality, intelligence, physique, beauty and labor. Looking at the current football teaching management in colleges and universities, the transformation of functions is lagging, and the information management mode of physical education teaching is not in place, which leads to the low work rate of teaching physical education. The content of sports information service is less, the advantages of Internet are not fully exerted, and the application of information technology is not deep. The selection of football curriculum content lacks pertinence. As an important guiding material for football teaching, the content has a direct impact on the quality of football teaching, so it is very important to choose the content of football courses reasonably. Nowadays, when teaching students in

colleges and universities, emphasis is placed on cultivating technical and skilled talents, and students are required to obtain the professional physical fitness required for their professional posts through football classroom teaching during the school period, to meet the requirements of post talents. This requires the school to choose the teaching methods and contents reasonably according to the actual situation of students in the face of students in different positions. When teaching football in colleges and universities, the course content is basically the same. At the same time, facing students of different positions and majors, different teaching contents are not adopted, which to some extent affects the effect of football teaching and is not conducive to the effect of football training. At the same time, teachers are more concerned about the completion of teaching tasks in teaching, and pay less attention to the

learning effect, which leads to the violation of the actual concept of training sports talents.

The evaluation system of football teaching is not perfect. When teaching football courses in colleges and universities, there are often imperfections in the evaluation system, which are mainly manifested in the following aspects: there are unreasonable evaluation methods. When evaluating students' football, teachers only examine students' football skills and regard the evaluation as the result of students, so it is easy to have unfair evaluation. In the evaluation process, there is an unfair situation, teachers use unified assessment standards for students, will also cause unreasonable assessment situation; After the completion of the assessment, the teacher did not guide the students' existing problems, which affected the improvement of students' football level.

Table 3. Teachers' football teaching methods.

Football teaching method	Teacher lecture	Teacher's lecture plus courseware	Teacher's lecture plus discussion	Students learn with tasks.
Proportion (%)	25	45	20	10

Table 3 shows teachers' football teaching methods. Most teachers adopt the form of telling and courseware, and courseware is one of the commonly used teaching media. Pictures, videos and other materials are added to the courseware to visually reflect the teaching content. However, courseware teaching has been developed for many years in China, and it is not innovative. In addition, the content of courseware basically comes from textbooks, which can't really improve the teaching effect.

#### Teaching reform of special course of football training under "internet plus 3" modes

With the penetration of "internet plus" model in college football courses, the content of football teaching has been continuously expanded. Teachers rely on advanced modern information technology to provide targeted learning plans for students, so that students can actively participate in sports training

and maximize their physical fitness. However, due to the influence of traditional teaching, many colleges and universities have strengthened the reform of information-based teaching. However, due to cognitive bias, multimedia teaching only in theoretical classes does not give full play to the advantages of Internet resources, nor does it really integrate with football.

#### ***Football course teaching reform program***

According to the physical characteristics of students in different grades to develop targeted football teaching objectives. After formulating the overall football teaching objectives, the teaching content of physical education in different grades is formulated comprehensively through the information teaching mode. In the actual situation, the school carries on the comprehensive and effective division of the physical education classroom teaching content to ensure that the students reasonably master the college football classroom learning content.

The single football teaching method can't meet the actual needs, so we must make use of the situational physical education teaching method to stimulate students' interest in learning. Therefore, in the process of practice, teachers make students devote themselves to football teaching scenes by setting them reasonably. At the same time, it is necessary to

carry out the information-based teaching of college football courses under the background of the "internet plus" era, and create information-based teaching situations, mainly including competition scenes and game scenes. The specific implementation scheme is shown in Figure 1.

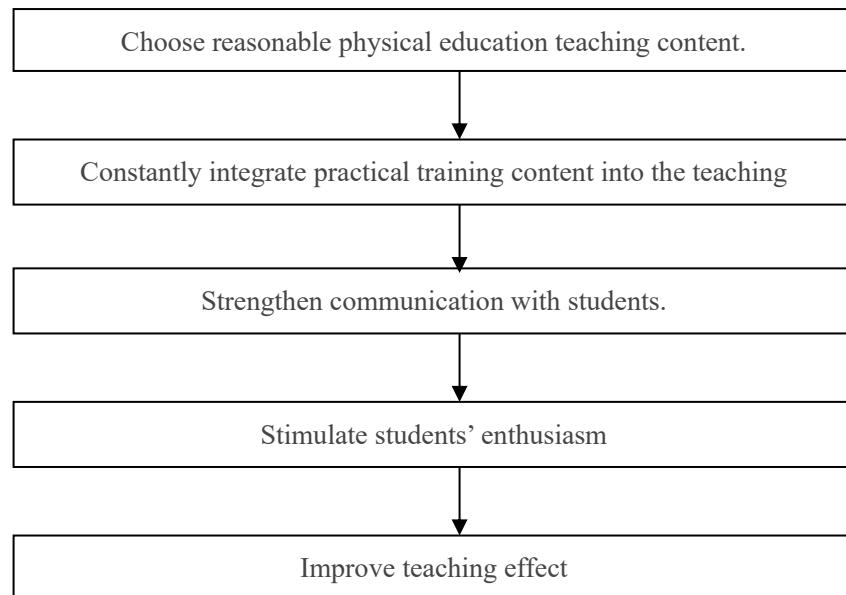


Figure 1. Football curriculum reform process.

Due to the rapid update of classroom learning content, the development of football teaching in some colleges and universities can't meet the improvement of students' physical fitness. Therefore, schools should take their own football teaching conditions as the basis, take students' demand for football learning as the core, apply innovative Internet technology, reasonably change the existing textbook content, and incorporate some football frontier information to lay a solid foundation for students' development. There is a big difference between the Internet-based football teaching course and the traditional football teaching process. Theoretical courses are often more than practical training courses. Although this is difficult to change, to really improve the football teaching level in colleges and universities, some practical teaching contents must be appropriately added under reasonable circumstances. For example, students can be guided to carry out self-fitness in the teaching process. Teachers should guide and inspire

students, teach them some self-fitness skills and enrich their knowledge structure. Let students apply the theoretical knowledge they have learned to practice, promote their development and progress, enhance their awareness of fitness, and truly establish the football concept of lifelong fitness. Football teachers should strengthen exchanges and communication with students, clarify students' interests and learning needs, make reasonable teaching plans with students as the main body, constantly stimulate students' enthusiasm and improve teaching effect.

Football teaching evaluation mainly affects students' learning efficiency. It is necessary to carry out football teaching evaluations reasonably and apply appropriate evaluation methods. With the reform of China's education system, the traditional exam-oriented education has gradually withdrawn from the stage, and quality-oriented education has taken the place of exam-oriented education and become the mainstream. Quality-oriented education pays

more attention to students' comprehensive ability. In football teaching, we should build a diversified evaluation platform through information technology, enrich the evaluation content, improve the feasibility of evaluation, collect reasonable information, and formulate indicators reflecting students' learning situation and attitude, including achievement indicators and process indicators. Through the implementation of reasonable evaluations, students' attention to the football course has been enhanced.

## Conclusion

Federated learning can enable mobile devices to train a shared prediction model cooperatively, and save all training data on the device, to decouple machine learning and cloud storage data. This goes beyond forecasting on mobile devices using local models. As a required subject in colleges and universities, football courses are an indispensable part of the physical education teaching process, and the reform of football teaching courses is constantly changing and innovating. China's football curriculum education focuses on the teaching of technical movements and rules of football, which hinders the long-term development of football education in China. In this paper, taking the special football training courses in colleges and universities as the research object, starting from the information-based football training courses in the background of "internet plus" era, we summarized the reform mode of physical education courses, and explored the reform mode of information-based football teaching courses in the background of "internet plus" era, which laid a solid theoretical foundation and theoretical guiding significance for the development of "internet plus" physical education curriculum reform. The main results are as follows:

(1) Through the investigation of the present situation of football courses in colleges and universities, most schools offer mixed classes for boys and girls. Most of the classes are taught in the second, third and fourth semesters, and the class hours are generally 54-58 hours; It is pointed out that the football education mode of sports in internet

plus is the key measure to change the traditional sports education concept and mode and promote the sustainable development of sports. The deep integration of "internet plus" and football education, giving full play to the advantages of Internet resources and the convenience of mobile Internet terminals can effectively promote the informatization and intelligent development of football teaching, effectively improve teaching efficiency, enhance students' acceptance, and improve the matching of majors with the development of the times.

(2) The emergence of the "internet plus" teaching mode has caused a strong impact on traditional physical education. Focusing on traditional classroom teaching, we adopt the way of information teaching as a supplement, scientifically apply Internet technology and introduce mobile devices to inject fresh vitality into classroom teaching, boost the reform of physical education curriculum in colleges and universities, and realize the reasonable formulation of physical education teaching objectives, diversified physical education teaching methods, scientific physical education teaching content and rationalization of physical education teaching evaluation.

(3) Campus football characteristic school is the foundation project for the development of campus football, is the need for the sustainable development of campus football. The construction of football characteristic schools is a breakthrough to develop campus football, and a window to combine campus football, professional football and football youth training to work closely together. At the same time, through the selective evaluation system, excellent football reserve talents scattered in various schools can have the opportunity to stand out and be absorbed by professional clubs and national teams of different ages, to receive systematic training and become the backbone of the Chinese football team in the future.

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### Conflicts of Interest

The authors declare no conflict of interest.

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