

# *The Design of Adaptive Sports Plan Based on the Integration of Diversified Teaching of Physical Education in Colleges and Universities*

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**Abstract:** Diversified teaching of physical education in colleges and universities (PECU) is the application of different teaching methods to teaching physical activities, so that different types of students can find methods suitable for their own learning in the same sports, so as to increase students' interest in and participation in the course. The purpose of this article to study the design of adaptive sports program is to realize the scientificity and rationality of sports exercises through multimedia technology. This article mainly uses comparative and experimental methods to divide college students into experimental groups and control groups for classification research, and finally get the data. This article also uses expert method and questionnaire survey method to determine the credibility of the sampled objects. The data shows that there is no significant difference in the indicators of the two groups of students,  $P > 0.05$ , and the students who have undergone diversified adaptive sports teaching have better performances than the traditional teaching students.

## 1. Introduction

With the development of the socio-economic level, the continuous improvement of people's quality of life, and the increasingly diversified sports demand, PECU must be more adaptable to changes and innovations in the context of the new era. PECU is an important part of school education, and it is also indispensable for students in the process of lifelong learning, to cultivate talents needed by society. In the current stage of our country, the reform of college physical education (PE) curriculum has become a very critical issue.

There are many researches on PE teaching. For example, Miao Qingqing proposed that PE is the most important part of school education, aiming to improve the physical condition of students and promote their physical and mental health. In order to reverse the unfavorable situation of school PE, it is necessary to integrate both inside and outside classes into PE, and to encourage improvement

on the basis of multiple evaluations [1]. Yang Zhongwan said that there are contradictions between the current higher education PE ability and the teaching relationship, the teaching effect is worrying, and education reform is imperative. In order to improve the influence of college PE, college PE reform must start with teaching content, improve the relationship between PE classes, and meet the needs of the current development of college PE ability [2]. Zhang Yuan said that sports culture reflects a country's outlook on sports, is an important manifestation of the national outlook on sports in sports, and is one of the manifestations of psychological attitudes [3]. Therefore, it is an innovation to design the adaptive sports program for the diversified teaching of PECU. Research on this is a way of sports development, which can make sports teaching more vivid.

This article first studies the characteristics and modes of diversified teaching. Secondly, it explains the analysis of the influence of diversified teaching in PE. Then it analyzes the method of adaptive motion technology and the purpose principle of the scheme design. Finally, the advantages of adaptive sports program design and diversified teaching are analyzed through experiments and questionnaires.

## **2. Design of Adaptive Sports Plan for Diversified Teaching Integration of College Physical Education**

### **2.1 Diversified Teaching**

Diversified teaching methods in colleges and universities are a new model and a brand-new method. This new educational method mainly includes: classroom and practice methods. In the actual work process, a variety of teaching methods are used to improve students' interest in learning and exercise their physical ability. To achieve good results through the integration and development of different disciplines, etc., this is also one of the goals that the sports diversified curriculum reform needs to achieve [4-5].

The PE model is established under the guidance of certain teaching ideas and teaching theories. In the teaching process, a comprehensive and relatively stable strategy system must be pursued, which is related to teaching objectives, teaching content, teaching procedures and teaching methods. The teaching mode is a general teaching theory, and it is a reflection of teaching ideas and teaching rules [6-7]. It establishes the activities of teachers and students(TS) in the teaching process. The guiding principles for TS to conduct teaching and learning activities are the principles and application precautions that should be followed in the implementation of teaching procedures. From the perspective of teaching practice, the overall system that integrates teaching methods, teaching methods and teaching organization forms is the teaching mode. This teaching model enables teachers to accurately know what to do first, what to do later, and how to do it. What to do in the future? Turn the more abstract theory into a concrete operation strategy [8-9].

With the continuous deepening of the reform of PE and the increasing demand for the development of PE, the PE model has increasingly become the focus of discussion among academic circles and frontline teachers in various fields, and has a profound impact on the overall reform of PE. At the same time, it serves as a bridge in connecting sports theory and practice, and is a powerful summary of the PE system and teaching process, making the teaching process more specific and operable. Such a special education project has the foundation and conditions for its formation. It is also a process of achieving predetermined teaching goals or tasks in a specific teaching environment under the guidance of a specific teaching idea, a relatively stable teaching process structure and corresponding teaching [10-11].

PECU is diversified, involving a variety of sports, and at the same time adapting measures to local conditions, involving different types and different contents. The diversification of college PE teaching methods has led teachers to choose different forms according to the individual needs of students, and continue to innovate and further develop in practice. The diversified teaching modes of PECU mainly include three modes: autonomous learning, cooperative learning and competitive learning. In college PE, teacher-student interaction is a very important link. Communication and cooperation with TS in the classroom can effectively increase students' interest in learning sports. Using multimedia technology as an innovative means of teaching, and incorporate modern information technology into traditional education models to realize modern education concepts and methods.

According to the actual situation of the school, a sports goal of diversified training and integration of school sports has been formulated. After clarifying the school's own framework conditions and student needs, determine the diversification and multi-level formation, and combine the characteristics of the school to design a special project plan system and project content that meets the needs of students. The design goals of the diversified teaching and integrated sports program of college PE are mainly as follows: improve students' physical fitness, strengthen physical fitness, develop good living habits, and lay the foundation for lifelong exercise. At the same time, pay attention to gradual and orderly progress and make best use of the situation in the implementation process. Develop personalized development plans for different majors and different students and adjust them in time. Scientifically plan and rationally utilize and develop the school's existing site. Measures such as optimizing the design of the structure of the PE teacher team and improving the teaching management system to improve the quality of the diversified teaching and integration of sports programs in colleges and universities. Promote the professional development of teachers. Introduce new curriculum concepts and modern information technology in college PE classrooms to integrate modern technology with theoretical learning and practical teaching. Popularize sports and fitness knowledge, master basic skills, and use sports equipment to complete corresponding tasks among college students [12].

## **2.2 The Impact of Diversified Teaching**

The diversification of teaching methods is not simply superimposing several modern teaching methods, but is carried out on the basis of in-depth analysis of different teaching methods in combination with the specific conditions of PE. Make full use of each teaching method, from the cognitive knowledge process, the setting of learning goals, the learning process of technical actions, the practical process, the feedback and the process of consolidation and improvement. Careful and targeted teaching is carried out to ensure that each connection is optimized in education The impact of teaching in the process. Experimental results show that this diversified teaching method can improve the effectiveness and quality of teaching for a long time.

In traditional education, students are often bored with repeated basic technical and tactical exercises. The reason for this is that they often neglect a deep understanding of the technical structure and tactical connotation of the action. They just practice after observing and imitating, and use the freshness of practice methods to increase their interest in sports. But over time, because the key connections and skills of technical movements were not considered, external interests did not translate into cognitive interests. The effect of students' technical learning movements depends to a large extent on their cognitive methods and understanding of key technologies. In the form of teaching, students can organize and carry out classroom activities by playing the role of teachers,

participate in the entire classroom process, improve their cognitive level, and develop various skills. In order to be able to convey the content of the course and carry out teaching activities, students must actively prepare for the course.

The teaching process of the traditional teaching method is observation-imitation-practice, but the diversification of sports teaching methods has changed this mode. In the course of practice, students assume the responsibility of each other and the responsibility of the group leader. They must not only strive to master the correct technical movements, but also pay attention to observation and quickly correct the mistakes in the movements of the students. The application of concepts in practice improves the ability to solve simple problems based on the principle of mastering knowledge. On the other hand, when students practice bad actions, they can ask their classmates for advice in time to speed up the dynamics of technical actions.

Learning and mastering sports technical movements is a relatively fast process, and improving sports technical level and skills is a long-term process, the result of long-term continuous training and reinforcement, and is affected by many factors. Diversified teaching methods have more advantages than traditional teaching methods in terms of the definition of common learning goals, the creation of a harmonious atmosphere, the forms of learning and training, mutual assistance and formative evaluation, and promote students' interest and accuracy in learning.

### 2.3 Design of Adaptive Motion Scheme

In PE, the law of physical and mental development of students determines their sports performance and physical fitness, and these are closely related to the multi-level and multi-form teaching methods in colleges and universities. Therefore, when conducting multiple technical trainings, we must pay attention to analyzing the characteristics of different types of movements and adopt appropriate and effective means to achieve it. At the same time, it should be noted that the corresponding courses should be formulated according to the characteristics and physical requirements of students of different ages. The adaptability of various teaching techniques of college PE is mainly related to the adaptability of students' physical and psychological conditions in different environments. This new teaching form can effectively guide a wide range of sports events, and at the same time allow students to better respond to external stimuli through their personal characteristics, so as to achieve physical and mental development.

Adaptive technology is a new function of PE. Unlike other technical and tactical functions, it can help students better understand and master sports skills. Therefore, it has great benefits for students. It is based on the interaction between people and the environment, through extensive analysis, evaluation and self-regulation of factors such as information resources, knowledge and experience. Using this method in PE classes can enable teachers to conduct physical activities in a more targeted manner.

In the human perception system, visual information is rich and vivid, and dynamic visual information occupies a large part. People use smart closed-circuit television systems to monitor moving targets in the scene in real time, analyze and detect target behaviors, and react accordingly. The detection and tracking of moving targets is the basis and key to realize intelligent monitoring, as well as the basis of later recognition and classification.

The closed-circuit television system is widely used in various occasions and is becoming an effective security method, which can automatically monitor the scene in real time, detect, track and identify the moving targets on the scene, and give corresponding feedback information. At present, common methods for detecting moving targets include background subtraction, inter-frame

difference, and optical flow.

(1) Background subtraction formula:

$$C(a,b) = \begin{cases} 1 & R_l(a,b) - S_l(a,b) \geq P \\ 0 & R_l(a,b) - S_l(a,b) < P \end{cases} \quad (1)$$

Among them,  $R_l(a,b)$  is the image of the  $l$ th frame,  $S_l(a,b)$  is the background image of the  $l$ th frame, and  $P$  is the selected gray value.  $C(a,b)$  is the binary image obtained by the background subtraction method, that is, the moving area of the moving target. The establishment and update of the background model is very important to the detection and tracking results of moving targets.

(2) The inter-image difference method uses pixel-based time difference and threshold method to extract the moving target area between consecutive image sequences in an image, which is the simplest background estimation method. In a series of images, there is a strong correlation between the images. When there is a moving target, two adjacent picture frames will have obvious differences in the area of the moving target. If the absolute value of the difference between the gray values of the two images is greater than the threshold, the target edge becomes:

$$C_v = \begin{cases} 1 & |R_v - R_{v-1}| > P \\ 0 & |R_v - R_{v-1}| \leq P \end{cases} \quad (2)$$

Among them,  $P$  is a given gray closed value,  $R_v$  is the  $v$ -th frame of video image. The adjacent frame difference method is relatively simple, easy to implement, fast detection speed, high real-time, insensitive to external changes such as ambient lighting, and can be well applied to the situation where there are multiple moving targets and camera movement.

(3) The calculation of the optical flow method is generally based on the three assumptions of constant luminosity, continuous time and coherent space. There are generally two optical flow field search algorithms: local optical flow method and global optical flow method. The optical flow method can identify the moving target well, and obtain the size, shape, position and other information of the moving target when the camera moves or does not know any information in the scene. However, the optical flow process is usually very complicated, the calculation takes time, and the noise reduction is relatively low.

(4) Purpose of scheme design

The practical application of the adaptive exercise plan in PE can enable students to fully integrate the three aspects of morality, intelligence, and physical into the learning process. In fact, adaptive sports have been vigorously promoted and supported, and have achieved excellent results. Creating scenarios in PE can greatly arouse the emotions of students, let them feel more passion and innovation in PE, and make PE more vivid while achieving educational goals. For example, timely creation of certain situations in college sports can more effectively stimulate students' interest in sports and improve the quality of courses.

(5) Design principles

1) Implement the "health first" principle. We must always put health in the first place, while taking into account the realization of teaching goals, so as to allow students to fully practice in the situation, but also to give them new motivation and satisfaction. In a real situation, keep students active and healthy.

2) Follow the principles of students' physical and mental development. Must match the psychological characteristics of students of different ages. Judging from the life and learning

experience of students, as well as their curiosity for new things, sports scenes with characteristics of the times have emerged.

3) The principle of student subjectivity. Must conform to the principle of subjectivity, not only to create a "teaching" context for teachers, but also to create a "learning context" for students.

4) Scientific principles. It is necessary to follow the objective laws of the development of things and adhere to the characteristics of the physical and mental development of students. In addition, the layout of the classroom is based on the actual needs of teaching materials to meet the needs of students.

### **3. Diversified Experiments of PE in Colleges and Universities**

#### **3.1 Questionnaire Design**

According to the purpose and content of this research, the elements of the questionnaire were compiled on this basis. After testing and several revisions, I have listened to the suggestions and opinions of education and psychology experts, and removed some less relevant content to form a preliminary questionnaire. Perform preliminary statistical analysis based on the preliminary survey results, repeated revisions and improvements, to ensure that all items can more accurately express the survey content, and to ensure that the questionnaire has high content validity.

#### **3.2 Reliability and Validity Test of the Questionnaire**

The "expert method" is used to check the validity. After the questionnaire used in this survey was compiled, 10 experts were invited to evaluate the validity of the questionnaire. The approval values of the questionnaires are all above 0.8, indicating that the questionnaire has a high level of validity. The reliability test adopts the "retest method". The questionnaire was distributed to the test subjects before the start of the experiment, and the test was re-tested two weeks later. The reliability coefficient of the test results is 0.85, indicating that the questionnaire is very reliable.

#### **3.3 Questionnaire Distribution and Collection**

The questionnaires were mainly distributed to college students. A total of 100 questionnaires were distributed and 90 questionnaires were effectively collected. The recovery rate is 100%, and the effective rate is 90%.

#### **3.4 Experimental Research Method**

Before the classroom experience, perform diagnostic tests on the physical condition and basic technical level of all subjects to check whether there are significant differences between the experimental group and the control group. The experimental group adopted different classroom teaching methods, and the control group adopted traditional teaching methods for classroom experience. After the experiment is over, statistical processing and analysis of all the data obtained are carried out to test the difference in the teaching effect of the two different teaching methods in the ordinary sports course.

### **4. Analysis of Experimental Results**

#### **4.1 The Difference Test of the Basic Situation of Students**

By measuring the basic enrollment, body shape, and physical fitness of the experimental group and the control group students, after statistical testing, the data in Table 1 are obtained:

Table 1: Different Results of Students' Basic Situation

	Age	Height	Weight	Grade
Experimental group	19	175	68	337
Control group	20	176	67	325
Difference	-1	-1	1	12
P value	0.856	0.812	0.846	0.897

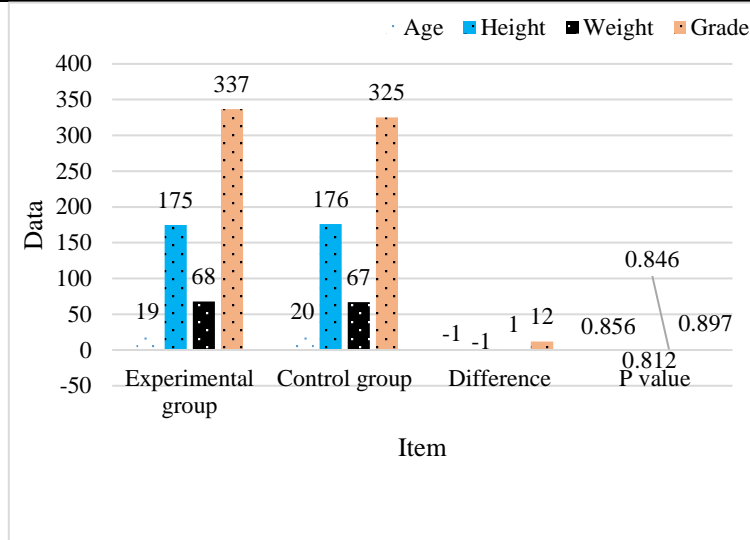


Figure 1: Different Results of Students' Basic Situation

As shown in Figure 1, we can see that students are generally 19 or 20 years old, their weight is generally 68 kg, and their height is above 175. However, there is no significant difference in the indicators between the experimental group and the control group.

#### 4.2 Comparison of Sports Performance between the Experimental Group and the Control Group

After the teaching experiment is over, the experimental group and the control group's achievement, technical evaluation, theory, and final scores are processed by mathematical statistics. It is found that the experimental group students' scores are higher than those of the control group, reaching a very significant level of difference. The specific situation is shown in Table 2:

Table 2: Comparison of Sports Performance between the Experimental Group and the Control Group

	Experimental group	Control group	P value
Technical Evaluation	8.2	7.8	0.001
Theory	9.7	14.5	0.005
Achievement	7.4	7.1	0.125
Manner	3.5	4.1	0.039

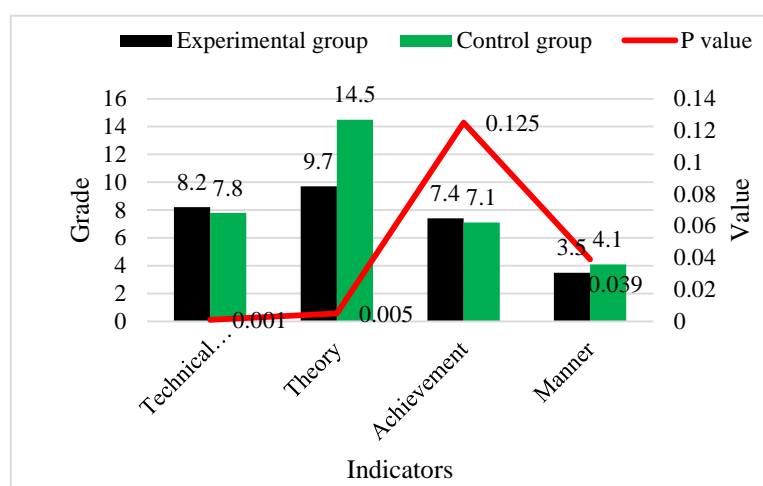


Figure 2: Comparison of Sports Performance between the Experimental Group and the Control Group

As shown in Figure 2, we can see that from the standard deviation of each performance, the variable standard deviations of several performances of the experimental group are smaller than those of the control group. It shows that the students have high stability in mastering the movement technique. Diversified teaching methods are far superior to pure traditional teaching methods in terms of correct and standardized mastering of technical movements for students.

## 5. Conclusion

The diversified teaching of PECU refers to the goal of cultivating college students' lifelong exercise habits, developing a good sense of exercise and fitness, and scientifically and rationally arranging sports to promote their physical and mental health. Various forms are adopted according to the differences in physical fitness of students and the characteristics of different stages. Conduct education. Diversified PE methods are of great significance in the design of adaptive sports programs. According to the experiment in this article, diversification of teaching can make the effect of PE better. Therefore, the design of adaptive motion scheme is very necessary.

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