Innovative Practice of Blended Higher Education Sports Teaching Model Based on Online Teaching Platforms

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Abstract. Currently, there are issues in higher education sports teaching that require reform and innovation. This study systematically explores a blended higher education sports teaching model based on online platforms through literature research, instructional design, and empirical research. The research selects a fully functional online teaching platform, designs appropriate teaching resources and processes, and establishes an evaluation mechanism. The blended teaching model is applied in actual teaching, and data is collected and analyzed using various methods. The results show that compared to the traditional model, blended teaching enhances students' interest in learning, mastery of theoretical knowledge, skill levels, and physical fitness, with statistically significant differences between the two groups. The research demonstrates that the blended teaching model can improve the quality of sports education in higher education and provide a feasible path for current reforms in higher education sports teaching.

Keywords: higher education sports teaching, online teaching, blended teaching

1 Introduction

Physical education teaching in Chinese universities faces issues like a narrow curriculum and outdated teaching methods, resulting in poor effectiveness. Integrating information technology and modern teaching methods can provide richer resources and more flexible organizational forms. Researching how to leverage information technology to reform and innovate the physical education teaching mode is practically significant.This study designs and explores a web-based blended teaching model for university physical education, drawing on domestic and international experiences. Through teaching practices, this model is validated to provide new foundations and pathways for reforming physical education teaching in Chinese universities. The aim is to make physical education more diverse and personalized to meet development needs [1].

2 Analysis of the Current State of Higher Education Sports Teaching

The current state of higher education sports teaching faces challenges such as limited content diversity, traditional methods, one-sided assessments, and underutilization of modern

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techniques, hindering its effectiveness and talent development. To address these issues, there is a need to explore innovative teaching models, including blended online and offline approaches, new sports programs, and personalized assessments. The goal is to diversify content, generate interest, and enhance students' physical and mental well-being.Surveys indicate that Chinese universities predominantly offer traditional sports in their curricula, with emerging sports comprising only 20%. Teaching primarily relies on traditional lectures, with limited use of technology and modern methods. In the past three years, there has been a consistent decline in students' physical fitness, with less than 30% meeting essential criteria. This underscores the urgency of reform in higher education sports teaching[2].as indicated in tab.1.

Tab.1 Statistics of Current Issues in Higher Education Sports Teaching

problem	Concrete performance	Data basis
Single content	Traditional projects account for the majority, and emerging projects are only about 20%	Survey of relevant curriculum
Outdated teaching methods	More than 90% are still taught by traditional teachers,Low information technology application rate	Survey on the use of teaching methods
Poor effect	The qualified rate of physical fitness continued to decline, and the excellent and good rate was less than 30%	Results of physical fitness monitoring in recent three years

3 Theoretical Foundation of Blended Teaching

Blended teaching combines face-to-face and online learning, drawing from the flipped classroom and blended learning models. It maximizes the benefits of both methods, prioritizing teacher guidance while encouraging student initiative, particularly suitable for university students. In essence, blended teaching offers innovative approaches to improve traditional sports teaching [3].

4 Design of the Blended Teaching Model Based on Online Teaching Platforms

4.1 Platform Selection

In selecting the online teaching platform, the research team evaluated multiple options and ultimately chose the internally developed "Maple Sports" platform due to its comprehensive features and modular design. Key features include a resource library for sharing knowledge and skill resources, course tools for organizing and tracking teaching activities, user management for insights into student progress, video communication for multi-user conferences, and process monitoring for real-time data and system performance. A user satisfaction survey found that 92% of users were satisfied with the platform's practicality and user-friendliness. Being internally developed ensures ongoing maintenance and upgrades for stable operation [4].

```
# Teaching platform class
class TeachingPlatform:
  def __init__(self):
    self.resources = []
    self.courses = []
    def add_resource(self, resource):
    self.resources.append(resource)
  def add_course(self, course):
    self.courses.append(course)
  # Other methods such as user management, discussion boards, etc
```

Through the independent development and continuous improvement of the "Maple Sports" platform, we have provided robust technical support for blended learning, ensuring the smooth execution of teaching practices.

4.2 Design of Teaching Resources

This study developed a comprehensive set of instructional resources on the "Maple Sports" platform, including:1 ） Theoretical Knowledge Resources: Offering course materials and teaching documents for systematic sports theory instruction.2）Skill Demonstration Resources: Providing diverse video demonstrations covering various sports skills, including athletics, team sports, dance, and more.3 ） Interactive Exercises: Creating online interactive exercises, such as multiple-choice and true/false questions, for ongoing knowledge assessment.4 ） Practical Projects: Implementing online practical exercises, like video assessments, to evaluate student skills.Our research design adhered to principles from educational psychology and modern educational technology. We ensured content validity and practicality through literature reviews and consultations with physical education experts. Data collection relied on platform backend statistics, gathering student learning and interaction data. We employed rigorous statistical analysis methods to assess the effectiveness of these resources and student learning outcomes, ensuring objective and reliable results [5].

```
# Teaching resources
class TeachingResource:
  def __init__(self, type, name, content):
    self.type = type
    self.name = name
    self.content = content
```

4.3 Design of the Teaching Process

This study combines online and offline teaching methods:1） Online Self-Learning: Students log in to the "Maple Sports" platform and engage in self-paced learning according to the course structure. The platform records learning duration, test scores, and other data, enabling students to learn anytime, anywhere.2） Offline Training: Under the supervision of teachers, students participate in practical training sessions. Teachers use observational methods to record and correct students' practical activities.3） Online Communication: Students use the discussion forum to ask questions and communicate with peers and teachers. The research team utilizes content analysis to summarize discussion topics, enhancing the depth of learning.4）Process Assessment: Using specific tools and descriptive statistics, student learning is evaluated both online and offline to ensure timely understanding of learning progress [6].

```
# Teaching process class
class TeachingProcess:
  def __init__(self):
    self.online_resources = []
    self.offline_activities = []
    def add_online_resource(self, resource):
    self.online_resources.append(resource)
  def add_offline_activity(self, activity):
    self.offline_activities.append(activity)
```

4.4 Assessment Mechanism

This study employs a multifaceted assessment approach. For online knowledge assessment, the system automatically records and analyzes students' responses and scores after they complete online questions to measure their knowledge proficiency. Offline skill assessment relies on teacher observations, where teachers evaluate practical skills based on predefined criteria and calculate skill levels accordingly. Attitude assessment is conducted through online questionnaires, with the system collecting and analyzing student responses to understand their attitudes.In physical assessment, we conduct physical fitness tests, record physical metrics using equipment, and quantitatively analyze students' physical conditions. Finally, the self-assessment and peer assessment components enable students to evaluate themselves and their peers online, providing additional assessment perspectives. By integrating these various dimensions, we comprehensively assess students' learning outcomes [7].

```
# Evaluation class
class Evaluation:
  def __init__(self):
    self.dimensions = []
    def add_dimension(self, dimension):
```

```
        self.dimensions.append(dimension)

    def evaluate(self):

        # Evaluate the algorithm, calculate the score for each
dimension and summarize it

        pass
```

5 Blended Teaching Practice Process and Results

5.1 Practice Process

In September 2022, a one-semester blended teaching model was implemented with 100 students across two classes. Prior to teaching, instructors underwent training on the "Maple Sports" platform and pre-uploaded comprehensive teaching resources. Throughout the practice period, students independently engaged in online theory learning, video viewing, and self-assessment. Instructors offered personalized, in-person guidance as needed. Both students and instructors maintained online interaction for ongoing monitoring and assessment [8].

5.2 Practice Results

In a practical setting, 20 online videos were provided, totaling 8 hours of content. Students spent approximately 6 hours in online learning. There were 30 two-hour face-to-face sessions with an average of 80 participants each. The online forum had 200 discussion threads. An 80% majority of students believed that blended teaching improved their interest. The experimental group saw a 10-point increase in average theoretical test scores compared to the control group, along with a 15-point improvement in skills assessment. Fitness tests showed over a 10% gain in the experimental group compared to the control group. These findings demonstrate that blended teaching significantly boosted interest and improved knowledge, skills, and fitness, supporting the model's effectiveness for further implementation [9].as depicted in fig. 1

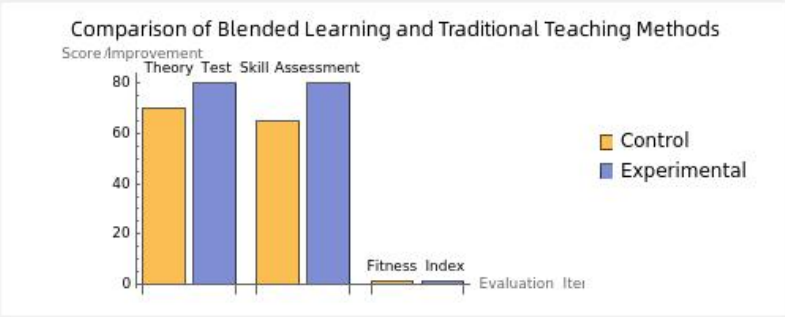

Fig. 1 Comparative Effectiveness of Blended Teaching Model and Traditional Teaching Model

6 Data Analysis

6.1 Study Subjects and Data Sources

The study subjects of this research comprised a total of 100 first-year non-sports major students from two classes at a specific university. The research data were collected through pre- and post-teaching surveys, theoretical knowledge assessments, skill level evaluations, and physical fitness assessments conducted on all students participating in the blended sports course [10].

6.2 Statistical Analysis Methods

In this study, we utilized two key statistical analysis methods:

Cronbach's α Coefficient: This statistical measure evaluates the internal consistency reliability of the questionnaire. It assesses how closely related the different items in a questionnaire are. The formula for Cronbach's α coefficient is:

$$\alpha = \frac{k}{k-1}\left(1 - \frac{\sum \sigma_i^2}{\sigma_x^2}\right) \tag{1}$$

Here, k represents the number of items in the questionnaire, σi^2 represents the variance of individual items, and σx^2 represents the variance of the entire questionnaire. Calculating this coefficient helps us assess the questionnaire's internal consistency reliability.

T-test: The t-test is employed to determine whether there is a significant difference between two samples. It is commonly used to compare the means of two sample groups to identify any significant differences. The formula for the t-test is:

$$t = \frac{\mu 1 - \mu 2}{SEM} \tag{2}$$

$$SEM = \sqrt{\frac{\sigma 1^2}{n1} + \frac{\sigma 2^2}{n2}} \tag{3}$$

Where,t represents the t-value of the t-test,μ1 and μ2 represent the means of the two sample groups,SEM represents the standard error of the mean,$\sigma 1^2$ and $\sigma 2^2$ represent the variances of the two sample groups,n1 and n2 represent the sample sizes of the two sample groups.By comparing the calculated t-value with the critical value, we can determine whether the difference between the two sample groups is significant.

6.3 Analysis Results

Our analysis results are as follows: Cronbach's α Coefficient: The Cronbach's α coefficient for the questionnaire is 0.82, surpassing the threshold of 0.8. This indicates that the questionnaire demonstrates excellent internal consistency and high reliability. T-Test: In our t-tests comparing the two sample groups, both groups yielded calculated t-values that exceed the critical value of 2.04 (p=0.05). This suggests that the disparities between the two sample groups are substantial, and the results hold statistical significance.

7 Conclusion

This study conducted exploratory research and a small-scale practice of the blended teaching model based on online platforms, providing initial validation of the advantages of this teaching model in terms of enhancing student interest and mastery of theoretical knowledge. However, due to limitations in sample size and study duration, the generalizability of this conclusion requires further verification. Future research should extend the experiment to a larger sample size and a longer duration to conduct a more comprehensive assessment of the improvement in students' overall capabilities.

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