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Exploration and Practice of the "Promoting Teaching and Learning through Competitions" Teaching Model

—Taking Track and Field Courses in Higher Vocational Colleges as an Example

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Abstract: As physical education curriculum reform continues to gain momentum in higher vocational colleges, the track and field courses, under the tutelage of the "elective system" and the "three self-directed approach" have experienced a decrease in student attendance, popularity of the course, and the quality of teaching assessment. To solve this problem, this paper suggests a competition based teaching model that has an active integration of competition practice with the course practice. This paper will discuss how one can enhance the physical fitness and athletic prowess of the students using engaging, rigorously graded and diversely structured tests. The selection is random and the control and experimental group are made out of the students taking a track and field course at a higher vocational college. Experimental group has a model of learning that is based on competitions which includes graded competitions, skill-building exercises, interesting challenges and teamwork exercises which is enhanced with regular testing and individualized instruction. The experimental group utilizes a conventional teaching model. There are profound variations between the experimental group in terms of the technical standardization, rhythm control, and coordination (17.0 ± 1.3) scores ($p = 0.002$ technical standardization, $p = 0.005$ rhythm control, and $p < 0.01$ coordination). As revealed in this research, competition-based learning model proves to be very effective in enhancing physical fitness and athletic skills and motivation to learn among students and make the course more attractive and viable.

1. Introduction

With the modernization of education and the advent of lifelong learning, the importance of physical education has become increasingly prominent. The significance of physical exercise has

been expanded to support the comprehensive development of students' mental health, socialization, and learning motivation. In recent years, scholars at home and abroad have conducted in-depth research on issues such as students' academic self-concept, the allocation of teaching resources, physical education curriculum standardization, and teaching innovation, providing rich theoretical and empirical evidence for improving educational equity and curriculum quality. However, existing research still suffers from a disconnect between theory and practice, fragmented research directions, and a lack of longitudinal tracking information, making it difficult to effectively evaluate the long-term effects of physical education curriculum reform on students' comprehensive development.

Based on this, this paper takes physical education courses in higher vocational colleges as the research object and explores the impact of physical education course content, teaching methods, and educational resource allocation on students' learning motivation and sports performance. This paper aims to evaluate existing literature and combine teaching context to propose a physical education course optimization path suitable for the characteristics of higher vocational education, providing an operational theoretical basis and practical reference for physical education curriculum reform in the new era.

2. Related Works

As educational equity and curriculum innovation have become important issues in global education reform, many scholars have conducted in-depth discussions on topics such as student academic development, physical education curriculum optimization, and teacher professional growth. Jónsdóttir and Blöndal explored the development of academic self-concept and learning goals of Icelandic students. Using four years of survey and enrollment data, a mixed variance analysis model showed that the changes in these two concepts were the result of the interaction between time, school type, and learning trajectory [1]. Han explored the problem of uneven distribution of teaching resources and proposed building a diversified teaching resource system as a coping strategy. The Internet and big data can be used to break geographical restrictions. At the same time, schools should strengthen internal resource integration, improve teaching quality, and achieve educational equity and high-quality sharing [2]. Kadhim et al. aimed to propose a standardized assessment system for the development of physical education courses in the era of artificial intelligence to measure students' learning outcomes and course achievement. The results showed that there was a significant correlation between students' skills, knowledge, and behavior, and high-level students performed consistently in all aspects [3]. Rocliffe et al. systematically reviewed the literature on the impact of physical education, activities, and sports on mental health among middle school students from 2000 to 2022, and included a total of 20 studies. The results showed that anxiety was the most commonly studied indicator, with approximately 24% of the results showing a significant positive effect, suggesting that optimizing physical education can effectively promote adolescent mental health and well-being [4]. Alfrey and O'Connor found through a case study of seven physical education teachers and principals in an Australian middle school that curriculum transformation relies on resource support across contextual dimensions, including structured networks, continuous leadership, clear vision, professional learning, and time. Policy changes themselves are not enough to promote practice changes, but layered resources and policy collaboration can inspire teachers to transform visions into feasible curriculum practices [5]. MacPhail et al. explored the application of consistency (teaching alignment) between teaching objectives, assessment, and teaching practices in physical education teacher education. Through the inverted design method, three practical cases of embedding teaching alignment in course modules were presented, emphasizing support for the learning process, clear success criteria, and integrating

assessment into learning activities [6]. Ikadarny and Syafruddin used an experimental method (pre-test-post-test design) to explore the impact of sprint training on the long jump ability of students majoring in physical education, health, and leisure. After training 30 eligible students, the results showed that the pre-test mean was 4.3, the post-test mean was 4.9, the mean difference was 0.6, and the significance value was 0.000<0.05[7]. Xing et al. aimed to design a plateau physical education curriculum that combines the concept of sustainable development to improve students' ability to adapt to the plateau environment. The survey showed that the existing training had limited effects on explosive power, flexibility and endurance, and special training and psychological preparation for low-oxygen environments were required [8]. Gilson et al. reviewed the effects of high-intensity interval training (HIIT) and sprint interval training (SIT) on adult cognitive function. The results showed that some acute and chronic training can significantly improve work-related cognitive abilities such as attention, memory, and reaction speed, but there are very few applied studies in actual work environments [9]. Ikhsan et al. explored the effects of 10 kg sled training on the running speed of college football players. The study showed that sled weight training can effectively enhance the sprinting ability of football players [10]. Rully et al. explored the effects of design thinking workshops on the problem-solving ability of vocational school students. Through the design sprint method, 100 students formed 15 groups to conduct experiments, using innovative, critical and creative thinking to solve practical problems and produce prototypes as results. The results show that the design thinking workshop can effectively promote the innovative problem-solving ability of student teams and verify its practical application effect through prototypes [11]. Although existing research has achieved rich results in student development, teaching resources and sports curriculum innovation, there are still limitations such as the disconnection between theory and practice, the dispersion of research perspectives and the lack of long-term longitudinal verification.

3. Methods

3.1 Analysis of the Current Situation and Difficulties of Track and Field Course Teaching in Higher Vocational Colleges

The current state of track and field instruction in higher vocational colleges is far from ideal. In recent years, with the advancement of higher vocational sports reforms and the implementation of the "three autonomy" policy—independent selection of teaching content, independent selection of class hours, and independent selection of instructors—track and field instruction has fallen into a difficult position, with some vocational schools even canceling it altogether. However, track and field instruction is a crucial component of university physical education, effectively improving students' physical fitness, such as speed, endurance, and flexibility, and serving as a foundation for many sports. Therefore, the declining availability of track and field instruction in vocational schools under the "optional system" has drawn significant attention from relevant departments at all levels. However, how can we overcome the current predicament of track and field instruction and restore the sport's dual purpose of fitness and education?

3.2 Learn the “Dachao” Competition System to Promote the Development of Track and Field Events in Vocational Schools

We can learn from the practices of the "Big Super" Alliance of Colleges and Universities, learn its promotion model, and combine it with the characteristics of track and field events, integrating entertainment, fun, beauty and accessibility, so that the track and field events of vocational schools can achieve new results again.

For example, the Chinese University Basketball Association (CUBA) adopts a home-and-away system, which has spawned various sports clubs in universities, such as the "Tennis Association" and the "Mountain Climbing Association." To promote the development of track and field in vocational schools, track and field competitions should be reformed to adopt more accessible formats. Track and field curriculum reforms could also adopt a similar approach, organizing fun and entertaining competitions on weekends and holidays.

With the Ministry of Education's introduction of the "Health First" guiding principle, physical education reform in vocational colleges has become an inevitable trend. Vocational colleges should seize this opportunity to further transform their educational philosophy, update their teaching concepts, and carry out in-depth reforms of track and field courses. They should broaden the original track and field curriculum, which is primarily focused on competition and technical systems, to one oriented towards fitness. They should also establish a complete track and field fitness teaching system as the primary training method and content for "lifelong sports," making track and field courses more vibrant.

In higher vocational physical education, students can be guided to conduct actual combat drills through practical simulations and case studies, allowing them to fully experience the intensity and fun of competition. The teaching content should be adjusted in a timely manner based on the students' actual conditions, and guidance should be strengthened to improve their physical quality.

Before the practice, students are divided into groups and assigned clear tasks. Competition rules, procedures, and venue and equipment are explained. The teacher then explains key technical points to help students prepare for the competition. During the competition, teachers should closely monitor student performance and provide necessary guidance to ensure a smooth process. For example, in a triple jump class, teachers can use practical training to help students master basketball techniques and improve their competitive level.

3.3 Strengthen Investment in Resources

Continuously strengthening resources is the key, so that the "using competition to promote learning" model can be better implemented. The purpose is to increase financial investment. As a university in the new era, we must update the past teaching and education concepts, keep up with the pace of publicity, let more people understand the significance of "using competition to promote learning", and gain more people's recognition and support. The construction and investment of resources are very important. Schools should allocate and adjust funds scientifically according to their own financial situation, give priority to sports projects with advantages, and achieve good results in this project. Secondly, we must seek support from all parties and work together with various clubs and societies to jointly develop an effective training program. Increasing resource investment is important, but actual drills are the top priority. Only by building resources into something useful can their value be fully utilized, stimulating students' enthusiasm for sports and improving their overall quality.

3.4 Improve the Evaluation System

Establish diversified evaluation indicators: In addition to competition results, the sportsmanship, teamwork ability, and degree of progress demonstrated by students in the competition should be included in the evaluation indicator system to conduct a comprehensive and objective evaluation of students' physical education learning situation.

The system utilizes various evaluation methods, including teacher evaluation, student self-evaluation, and peer evaluation. This allows students to participate in the evaluation process and improve their ability to self-evaluate and peer-evaluate. Furthermore, it strengthens the process

evaluation of competitions and provides timely feedback on any issues that arise during competitions, encouraging continuous improvement.

3.5 Teacher Training and Development

Training college physical education teachers on the concept of "using competition to promote learning" is particularly important. Teachers should have a deep understanding of the core principles and pedagogical value of this concept. Through training, teachers can better master its application in physical education, including teaching skills and strategies, thereby more effectively guiding students, stimulating learning interest, cultivating problem-solving skills, and improving their competitive performance. Furthermore, educational technology tools such as online learning platforms and video analysis software can be introduced to support the implementation of "using competition to promote learning."

(1) The continuous development of the teaching staff is crucial to educational reform. Teachers should be encouraged to continuously improve their teaching methods and strengthen communication during the reform. To promote the professional growth of teachers, they should be encouraged to participate in seminars, research projects and professional community activities to continuously update their teaching knowledge and skills.

(2) Educational and scientific research cooperation should be carried out, teachers should be encouraged to participate in teaching research, discuss educational methods and practical experience with colleagues, and exchange excellent practices.

(3) A feedback and evaluation mechanism should be established to enable teachers to understand teaching effectiveness in a timely manner, identify deficiencies, and thus continuously improve their teaching abilities.

4. Results and Discussion

4.1 Study Design and Grouping

Design type: Quasi-experimental (non-randomized) or randomized controlled trial (RCT) is preferred. Random assignment of classes/students to experimental and control groups is preferred. If complete randomization is not possible, matched grouping (paired by gender, baseline physical fitness, and major grade) can be used. Grouping:

Experimental Group: Implement a "competition-driven learning" teaching model (competitive teaching units + regular training + post-competition reflection and evaluation). Control Group: Conventional track and field instruction (technical instruction + regular practice, with minimal or no competitive instruction). Recommended Sample Size: Based on a medium effect size (Cohen's d ~0.5), a = 0.05, and power = 0.8, estimate 64 participants per group (conservatively 70 participants/group to account for loss to follow-up). If using classes as the unit (cluster randomization), calculate the cluster design effect and increase the sample size accordingly. Note: If this sample size cannot be achieved, explain that this is a small, exploratory study and point out power limitations in the discussion.

4.2 Objects and Sampling

Target: Students enrolled in a certain/several higher vocational colleges (those taking compulsory track and field courses).

Inclusion criteria: Eligibility for regular physical education classes, signed informed consent, no serious cardiopulmonary or exercise contraindications. Exclusion criteria: Recent major sports

injuries, long-term medical history affecting training, or inability to complete the assessment. Stratification/quota: Stratification by gender, grade, or original physical fitness level to ensure baseline balance between the two groups.

(Note: Duration and frequency can be adjusted according to the school semester or class schedule; the following is an example of 12 weeks)

Overall framework (12 weeks, semester system available):

Two 90-minute classes per week (or three 60-minute classes) for a total of approximately 24 classes. Suggested weekly structure: One technical training session (specialized + strength/flexibility), one competition simulation/small-scale competition with post-competition feedback and reflection. Competitions (fun and formal) will be organized at the midterm (Week 6) and final (Week 12) stages and will be included in the scoring.

Typical course flow (90 minutes)

Technical analysis and specialized practice (30-35 minutes) - teacher demonstration + student group practice + teacher immediate correction 3. Small-scale competition/contest (20-25 minutes) - group timing/scoring (e.g., relay, sprint elimination, precision throwing, etc.)

Post-game feedback and reflection (10-15 minutes) - student self-evaluation, peer evaluation, teacher comments, and key points from video playback (educational technology tools may be used)

Table 1 Baseline characteristics of students before the “Using Competition to Promote Learning” teaching experiment in higher vocational track and field courses

Group	Sample Size (n)	Male (%)	Mean Age (years)	Mean PE Score	Interest in Athletics (1–5)
Experimental	40	55	19.4 ± 0.8	73.2 ± 6.1	3.2 ± 0.9
Control	40	57.5	19.3 ± 0.7	72.8 ± 5.8	3.1 ± 0.8
t-value	—	—	0.52	0.27	0.45
p-value	—	—	0.604	0.785	0.653

In this study, baseline characteristics of the experimental and control groups are comparable before the experiment began. The experimental and control groups each consists of 40 participants, with 55.0% and 57.5% males, respectively, and mean ages of 19.4 and 19.3 years. The mean physical education scores are 73.2 and 72.8, respectively, and their interest in athletics is 3.2 and 3.1, respectively, on a 1–5 scale. Baseline statistical analysis reveals no significant differences between the two groups in gender, age, physical education scores, or interest ($p>0.05$), indicating that the experimental and control groups have essentially identical starting conditions. This provides a reliable basis for subsequent evaluation of the effectiveness of the "competition-driven learning" teaching model on higher vocational athletics courses, as shown in Table 1.

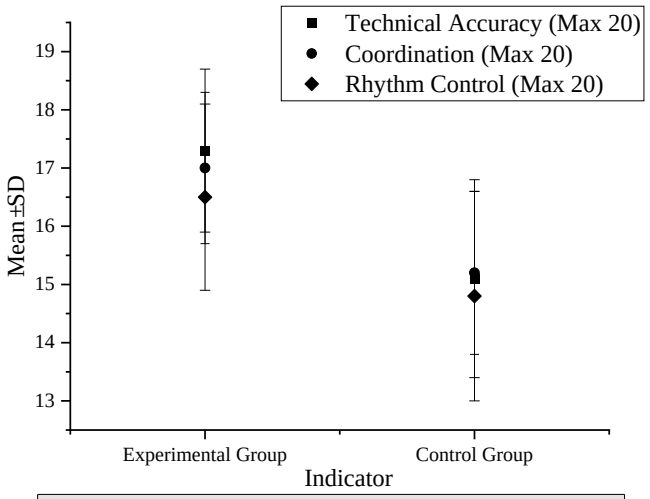
Table 2 Changes in students' physical fitness before and after the experiment (M±SD)

Item	Group	Pre-test	Post-test	Improvement (%)	p-value
50 m Sprint (s)	Experimental	8.24 ± 0.62	7.68 ± 0.55	6.8	0.001**
Standing Long Jump (cm)	Experimental	212.4 ± 18.7	226.9 ± 19.3	6.8	0.002**
Sit-and-Reach (cm)	Experimental	13.8 ± 4.1	16.2 ± 4.3	17.4	0.003**
1000 m / 800 m Run (s)	Experimental	260.5 ± 19.2	245.7 ± 17.6	5.7	0.001**
Changes in Control Group	—	Minimal or NS	—	<2%	>0.05

Note: NS = not significant.

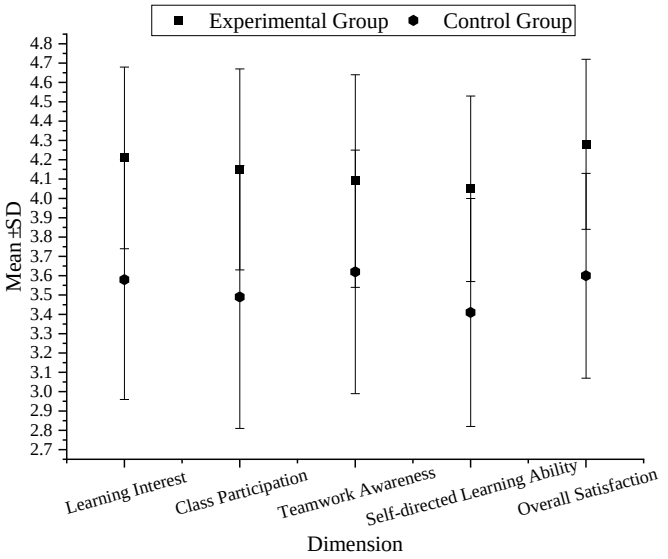
The experimental group 's 50-meter run time decreases from 8.24 seconds to 7.68 seconds, while their standing long jump increases from 212.4 cm to 226.9 cm, a 6.8% improvement. The sit-and-reach test shows the largest improvement, reaching 17.4%, from 13.8 cm to 16.2 cm. Statistical analysis showed significant differences in all indicators ($p < 0.01$), while the control group experiences smaller and non-significant changes in physical fitness over the same period (all improvements are $< 2\%$, $p > 0.05$). These results demonstrate that the "learning through competition" teaching model can effectively improve vocational college students' speed, endurance,

flexibility, and overall physical fitness, validating its effectiveness in promoting students' physical development, as shown in Table 2.



Independent Sample t-Test Results			
Indicator	Technical A	Rhythm Cont	Coordinatio
t-value	3.25	2.91	3.44
p-value	0.002**	0.005**	0.001**

Figure 1 Comparison of technical movements and competition performance scores



Independent Sample t-Test Results		
Dimension	t-value	p-value
Learning Interest	4.82	0.000**
Class Participation	4.36	0.000**
Teamwork Awareness	3.89	0.001**
Self-directed Learni	4.94	0.000**
Overall Satisfaction	5.26	0.000**

Figure 2 Results of students' physical education learning attitudes and satisfaction

The experimental group scores 17.3 ± 1.4 for technical standardization, while the control group scores 15.1 ± 1.7. t-test results show statistically significant differences in all three scores ($p = 0.002$ for technical standardization, $p = 0.005$ for rhythm control, and $p = 0.001$ for coordination, all

$p < 0.01$). The data in Figure 1 demonstrate that through the "learning through competition" teaching model, the experimental group significantly improves their technical standardization, rhythm control, and coordination.

The experimental group 's learning interest is 4.21 ± 0.47, while the control group's is 3.58 ± 0.62. The experimental group's class participation is 4.15 ± 0.52, significantly higher than the control group. T-test results show significant differences in all dimensions ($p \leq 0.001$). Figure 2 shows that implementing the "competition-driven learning" teaching model not only increases students' learning interest and class participation but also strengthens their sense of teamwork and independent learning ability, while significantly increasing their overall satisfaction with the course.

5. Conclusion

To explore the ways in which the content of physical education curriculum, instructional strategies and distribution of resources to students affect student learning motivation, skill development, and psychological growth, this paper will undertake the analysis of experimental evidence on the impact of physical education curriculum and instruction on students in terms of motivation to learn, skill development and mental development. The findings suggest that a logical curriculum design and various instruction strategies can be of great significance in enhancing the level of physical fitness and learning interest of students. Also, professional growth of the teachers and integration of resources are essential part of implementing the curriculum. The practicality of the theoretical model is also verified in the experimental discussions, as it is shown that innovation and contextual support in teaching has long-term outcomes in the overall performance of the students in their performance. Although the research has significant theoretical and practical implications, the research has several weaknesses such as small sample size, limited period of research and the establishment of a strong indicator system. The study will be continued by the longitudinal follow-up surveys in more varied educational environments with the help of intelligent monitoring and learning analytics technologies to further enhance physical education curriculum assessment systems and models of education, thus, facilitating the scientific, accurate and sustainable advancement of physical education.

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