

Design and Implementation of a Competition-Based Instructional Model for Physical Education in Higher Vocational Institutions

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Abstract: *This study designs and implements a systematic competition-based teaching model to enhance vocational college students' basketball skills, learning interest, and core professional competencies such as teamwork, stress resilience, and problem-solving abilities. Grounded in a literature review of the "learning through competition" concept and competition-based teaching models, a one-semester teaching experiment was conducted at a higher vocational college using experimental and observational methods. Students were divided into an experimental group (competition-based teaching: skills competitions, tactical matches, class leagues) and a control group (traditional teaching). Pre- and post-experiment assessments included skill tests, interest scales, and comprehensive quality measures. Results show that the experimental group significantly outperformed the control group in skill tests (spot shooting, passing accuracy, dribbling around poles), learning interest dimensions (attitude, participation willingness, extracurricular practice), and comprehensive literacy (teamwork, problem-solving, psychological resilience). The control group showed only marginal gains. The study concludes that a competition-oriented teaching model based on "learning through competition" effectively improves the quality of basketball instruction in higher vocational education, facilitating students' transition from passive reception to active skill enhancement and team practice, and organically integrating teaching content with competitive activities—aligning with vocational education's goal of cultivating practical abilities and overall quality within an integrated "teaching, learning, practicing, and competing" framework.*

Keywords: Smart Classroom, Secondary School Physical Education, Teaching Strategies, Information Technology.

1. Introduction

Against the backdrop of vocational education reform, higher vocational physical education faces problems such as teaching methods and student engagement. As an innovative teaching concept, learning through competition emphasizes stimulating students' motivation through contests and has shown certain application potential in teaching. Currently, basketball teaching exhibits insufficient skill acquisition, lack of interest, and underutilization of resources. Therefore, exploring a competition-based teaching model guided by learning through competition holds significant theoretical and practical importance.

2. Research Purpose and Methods

2.1 Research Purpose

This study aims to design and implement a competition-based teaching model guided by learning through competition, deeply exploring its application effects in basketball teaching, specifically analyzing the positive impacts this model has on improving students' basketball skills, learning interest, and overall. Currently, basketball teaching low classroom engagement, inadequate skill mastery, and teaching methods, making it difficult to fully meet the requirements of vocational education for cultivating students' practical abilities. Based on this, this study introduces a competition-based teaching model, utilizing the challenge and of competitions to create authentic learning scenarios, students' intrinsic motivation, and enhance their performance in basketball - specific skills, teamwork, and adaptability. Meanwhile, this study hopes that through the combination of theory and practice, it can provide an innovative and feasible teaching model for basketball teaching reform, thereby promoting the overall improvement of teaching quality.

2.2 Research Methods

2.2.1 Literature Research Method

This study will systematically search for relevant literature both domestically and internationally, the theoretical foundations and practical experiences of the concept of learning through competition, competition-based teaching models, and basketball teaching. Researchers will use academic databases such as CNKI, Web of Science, and Google Scholar, with keywords like "learning through competition," "competition-based teaching," "higher vocational basketball teaching," and "physical education reform," focusing on research papers, journal articles, and dissertations from the past decade. An initial retrieval of over 50 documents is expected, 20 core documents will be selected for analysis to clarify the theoretical framework and design basis of the study, providing academic support for the subsequent implementation of the teaching model.

2.2.2 Experimental Method

This study will conduct a one-semester teaching experiment in a basketball specialty course at a higher vocational college. The subjects of the experiment are students who have chosen the basketball course, randomly divided into an experimental group and a control group, with 30 people in each group. The experimental group will adopt a competitive teaching model, including basic skills competitions (e.g., shooting accuracy contests), tactical matches (e.g., 3v3 games), and class leagues in various forms; the control group will use a traditional teaching model, mainly focusing on skill explanations and regular training. Before and after the experiment, the researchers will evaluate the two groups of students through skill tests (e.g., fixed-point shooting scores), interest scale assessments, and comprehensive literacy

questionnaires to compare the changes in skills, interest, and literacy between the two groups, thereby verifying the actual effect of the competitive teaching model.

2.2.3 Observation Method

During the implementation of the competitive teaching, the researcher will meticulously record students' performance and behavioral changes during competition activities via on-site observation and video recording. The focus of the observation includes students' classroom participation enthusiasm, team collaboration behaviors, skill application situations, and emotional responses. To enhance the objectivity and systematic nature of the observation, the researcher has designed a standardized observation record form and invited an independent observer to assist with recording. After the observation concludes, the recorded data will be categorized and organized, and comprehensively analyzed in conjunction with the experimental results to fully assess the impact of the competitive teaching model on students' learning outcomes. Record students' performance and behavioral changes during competition activities.

3. Theoretical Foundation

3.1 Overview of the Concept of Learning through Competition

The integration of competitive elements into the learning process in the field of education has given rise to the innovative concept of "promoting learning through competition," which aims to stimulate intrinsic motivation for learning and enhance teaching effectiveness through competitive mechanisms [1]. Research in educational psychology shows that a moderately competitive environment can significantly increase learners' enthusiasm for participation; when the learning process transforms into challenging competitive activities, there is an increase in dopamine release, activating the brain's reward system, thereby generating sustained learning motivation [2]. Physical education is particularly suited to implementing this concept as competition is inherently a part of sports activities; systematically and standardly integrating competitive elements into the teaching process actually aligns with the essence of sports [3]. Traditional teaching models overly emphasize skill transmission while neglecting context creation, resulting in students passively receiving knowledge and skills training, the effects of which are often not lasting [4]. In contrast, the strategy of promoting learning through competition creates real problem-solving scenarios, allowing students to apply what they have learned in actual combat through competition, achieving unity of knowledge and action.

3.2 Current Status of Basketball Teaching in Higher Vocational Education

Surveys on basketball teaching practices in higher vocational colleges show that the current teaching situation is not optimistic, and teaching concepts and methods are in urgent need of innovation [5]. In the traditional teaching process, teachers still occupy an absolutely dominant position, with

students passively following the teacher's instructions to repetitively practice basic movements most of the time. Although mechanized training may form skill memory in the short term, it lacks the cultivation of situational application abilities, making it difficult for students to flexibly apply learned skills in real combat [6]. The problem of outdated textbook content is widespread; most higher vocational colleges still use traditional physical education textbooks, whose content arrangement deviates from the characteristics of vocational education and modern basketball development trends, failing to meet students' actual needs [7]. Compared to students from other types of universities, higher vocational students generally exhibit a stronger practical inclination and weaker interest in theoretical learning. However, the current teaching model neglects this characteristic, arranging overly rigid teaching content that fails to fully motivate students. The single classroom organization format, combined with large-class teaching models, significantly reduces students' actual exercise time. Negative emotions arising from waiting turns for practice severely impact learning outcomes [8]. The evaluation mechanism片面 emphasizes skill attainment while ignoring process evaluation and individual student differences, discouraging participation enthusiasm among students with weaker foundations. Although many higher vocational colleges organize various basketball competition activities, these activities often become disconnected from regular teaching, turning into mere entertainment or display events rather than being organically integrated into the teaching system, thus failing to truly enhance learning outcomes through competition.

4. Design of Competitive Teaching Model

4.1 Teaching Objectives of Competitive Teaching

The design of teaching objectives aims to comprehensively enhance the quality of basketball teaching in higher vocational education and students' comprehensive abilities through a competitive teaching model. When setting skill objectives, teachers not only focus on students' mastery of basic basketball skills (such as dribbling, passing, and shooting) but also emphasize the flexible application of these skills in real-game situations, addressing the gap between skills and application in traditional teaching. Emotional attitude objectives cultivate students' sense of cooperation, fighting spirit, and self-discipline through team collaboration and competitive activities, allowing them to experience growth in sports activities. Vocational ability objectives are closely aligned with the characteristics of vocational education, using the basketball competition environment to enhance students' teamwork, communication, and problem-solving skills, laying a foundation for their future careers. Cognitive objectives guide students to deeply understand basketball rules, develop technical and tactical awareness and game organization abilities, transforming them from passive learners to active participants. These four objectives are interwoven, jointly promoting the improvement of students' overall qualities. Teachers need to flexibly adjust the difficulty when designing, ensuring that the objectives meet the requirements of the new curriculum standards and fit the actual needs and ability levels of higher vocational students.

4.2 Competition Format Design

4.2.1 Basic Skills Competition

The basic skills competition focuses on training and competing in fundamental basketball techniques such as dribbling, passing, and shooting, enhancing students' skill proficiency and participation enthusiasm through fun competitions. The designed formats correspond with examples like the "shooting accuracy competition" in experimental methods, while also supporting skill tests (e.g., fixed-point shooting scores).

Dribbling Relay Race: Students are divided into groups for a dribbling relay, with obstacles (such as cones) set up on the court to increase the difficulty of the race. Each group must complete the relay within a specified time, testing dribbling speed and control ability, thereby improving basic skills proficiency.

Shooting Accuracy Competition: Within a set time (e.g., 2 minutes), students perform fixed-point shooting, recording their shooting accuracy. Shooting spots can be set at the free-throw line or three-point line, adjusting the difficulty according to students' skill levels. This activity motivates students to improve shooting accuracy and is directly related to skill tests.

Passing Accuracy Test: Students must accurately pass the ball to a designated area (e.g., marked circles), with each student getting 10 passing attempts, recording successful passes. This activity cultivates passing precision and teamwork awareness, laying a foundation for subsequent tactical training.

These competition formats are simple and easy to organize, quickly engaging students' enthusiasm while providing quantifiable criteria for skill improvement.

4.2.2 Tactical Opposition Matches

Tactical aims to cultivate students' tactical awareness and teamwork abilities through small-scale adversarial activities, simulating real match scenarios. The "3v3 match" mentioned in the experimental method is an important example; I further refine the design on this basis to ensure students can understand tactical applications in actual combat. 2v2: Conduct 2v2 in half-court, with teachers setting specific tactical tasks, such as "pick-and-roll cooperation" or "fast break counterattacks." Each match lasts 5-10 minutes, during which students must complete tasks in actual combat. This format suits beginners, gradually fostering tactical awareness. 3v3: Carry out 3v3 in half-court or full-court, with match rules close to official basketball games, increasing complexity and collaboration difficulty. Students need to flexibly apply basic skills and tactical cooperation, enhancing adaptability and team spirit. Through tactical, students can focus on practicing tactics within a limited space while strengthening communication and collaboration abilities in matches, providing practical opportunities for the enhancement of comprehensive literacy.

4.2.3 Class League

The class league is an essential component of competitive teaching, allowing students to experience a real match atmosphere through a complete event system, enhancing match experience and mental resilience. The design incorporates the description of "class league" from the experimental method, constructing long-term, systematic competition activities. **League System:** Organize by class, adopting a round-robin tournament lasting several weeks. Each team participates in at least 3-5 matches, recording wins, losses, and scoring rankings. This format helps students accumulate match experience and adapt to challenges from different opponents. **Cup System:** Hold a knockout-style cup tournament at the end of the semester, increasing match tension and challenge. Brief feedback sessions follow each match, stimulating competitive awareness and enhancing mental resilience.

4.3 Evaluation Methods for Competitive Teaching

4.3.1 Multi-party Participatory Evaluation Mechanism: Enhancing Fairness and Comprehensiveness

In the evaluation system of competitive teaching, multi-party participation is a key design element ensuring fairness and comprehensiveness. Self-assessment by students, peer reviews, and teacher guidance together form a multi-dimensional evaluation framework, breaking the limitations of traditional single-perspective evaluations. Through self-assessment, students can reflect on their performance, cultivating self-awareness and responsibility; peer reviews among classmates train their objective judgment and teamwork spirit. Teachers act as facilitators, collecting feedback from all parties through regular seminars and dynamically adjusting evaluation criteria accordingly, keeping the system adaptable and vibrant. This collaborative mechanism not only makes evaluation results fairer but also comprehensively reflects students' real needs and growth trajectories, providing more valuable references for teaching.

4.3.2 Process-based Evaluation and Timely Feedback: Focusing on Growth Rather Than Results

The competitive teaching evaluation system emphasizes process-based evaluation, placing students' participation, skill improvement, and teamwork at the core, rather than solely focusing on final results. Teachers design scientific recording tools, such as participation attitude scales and skill improvement record sheets, to quantify student performance and provide an objective basis for evaluation. After each competition, teachers quickly provide specific feedback, helping students clearly understand their strengths and weaknesses, allowing them to adjust their learning strategies in a timely manner. Meanwhile, teachers optimize instructional design based on this feedback, creating a positive interaction between teaching and evaluation. This growth-oriented evaluation method effectively reduces students' psychological pressure and stimulates their intrinsic motivation for continuous improvement.

4.3.3 Innovative Evaluation Methods and Comprehensive Considerations: Enhancing Scientific Rigor and Personalization

The competitive teaching evaluation system enhances the scientific rigor and personalization of evaluations by introducing innovative methods and technical tools. By using motion analysis software to record objective performance data of students, it compensates for the shortcomings of traditional observation; adopting a grading system instead of the traditional scoring system not only alleviates student pressure but also provides specific improvement suggestions, enhancing the guidance of evaluations. In terms of evaluation dimensions, the system comprehensively considers team and individual, skills and literacy, recognizing collective honor while also acknowledging individual progress, and encouraging innovative thinking. This comprehensive and personalized evaluation approach makes the system more targeted, motivating students to achieve breakthroughs in various aspects and injecting new vitality and possibilities into modern education.

5. Effectiveness Assessment of Competitive Teaching

5.1 Effectiveness of Basketball Skill Improvement

The selection of skill test indicators is based on the basketball-specific skill evaluation standards from the "National Guidelines for Physical Education Curriculum Teaching in Higher Education Institutions" and refers to the diversified skill assessment model proposed by Zhao Peng et al. in "Construction of an Evaluation Index System for

College Students' Motor Skill Learning Based on Core Competencies" [9]. The three tests—set shooting, dribbling around poles, and passing accuracy—are the most representative indicators for assessing students' basic basketball skills and can comprehensively reflect their mastery of core techniques such as shooting, dribbling, and passing. The validity and reliability of these measurement methods have been verified in Liu Xuan Chen's "Research on the Construction of an Evaluation Index System for Basketball Specialized Courses in Jiangsu Universities Based on Core Competencies" [10].

Table 1 data shows that both the experimental and control groups improved in the three basketball skill test indicators (set shooting, dribbling around poles, and passing accuracy), but the improvement in the experimental group was significantly greater than in the control group. In the set shooting event, the experimental group increased from 5.47 ± 1.32 points before the experiment to 8.63 ± 1.46 points, improving by 57.8% ; whereas the control group only increased from 5.53 ± 1.28 points to 6.84 ± 1.37 points, improving by 23.7%. For dribbling around poles (shorter time is better), the experimental group reduced their time by 22.3%, while the control group reduced it by 10.1%. The number of accurate passes in the experimental group increased by 64.1%, compared to 31.9% in the control group. All data differences were statistically significant ($p < 0.05$), indicating that the competitive teaching model is highly effective in improving students' basketball skills.

Table 1: Comparison of basketball skill test results between the experimental and control groups

Test Metrics	Group	Before Experiment	After Experiment	t Value	p Value
Fixed-point Shooting (Points)	Experimental Group	5.47 ± 1.32	8.63 ± 1.46	8.75	<0.01
	Control Group	5.53 ± 1.28	6.84 ± 1.37	3.92	<0.05
Dribbling Around Poles (Seconds)	Experimental Group	25.38 ± 3.45	19.72 ± 2.86	7.32	<0.01
	Control Group	25.42 ± 3.38	22.84 ± 3.12	3.06	<0.05
Pass Accuracy (Times)	Experimental Group	4.82 ± 1.53	7.91 ± 1.64	7.56	<0.01
	Control Group	4.79 ± 1.58	6.32 ± 1.57	3.84	<0.05

5.2 Comprehensive Quality Improvement Effect

The basketball learning interest scale used in this study was adapted from the "Physical Education Learning Interest Scale" compiled by Wang Xiaozan for evaluating the learning interest of primary and secondary school students in physical education [11]. This scale has been widely used in multiple domestic studies with a Cronbach's alpha coefficient of 0.87, indicating good internal consistency. The scale includes three dimensions: learning attitude, which evaluates students' level of emphasis on and attitude towards basketball courses; participation willingness, which measures the intensity of students' willingness to actively engage in basketball activities; and extracurricular practice, which assesses the frequency and persistence of students practicing basketball during their spare time. Each dimension contains 5 items, scored using a 5-point Likert scale. Table 2 data shows that competitive teaching has been remarkably effective in enhancing students' interest in basketball learning. The experimental group showed greater improvement in the three dimensions of learning attitude, participation willingness, and extracurricular practice compared to the control group. Notably, in the extracurricular practice dimension, the

experimental group improved from 2.95 ± 0.72 to 4.12 ± 0.65 , with an increase of 39.7%, and $p < 0.01$; whereas the control group only improved from 2.98 ± 0.70 to 3.24 ± 0.68 , with an increase of just 8.7%, and $p > 0.05$, not reaching statistical significance. This indicates that competitive teaching not only increased classroom learning interest but also effectively promoted students' enthusiasm for extracurricular independent practice.

Table 2: Comparison of Basketball Learning Interest Scale Scores Between Experimental and Control Groups

Measurement Dimension	Group Type	Pre-test Data (M $\pm$ SD)	Post-test Data (M $\pm$ SD)	t Value	p Value
Learning Attitude	Experimental Group	3.26 ± 0.58	4.35 ± 0.47	8.13	<0.01
	Control Group	3.28 ± 0.56	3.56 ± 0.52	2.12	<0.05
Willingness to Participate	Experimental Group	3.32 ± 0.63	4.48 ± 0.51	8.26	<0.01
	Control Group	3.30 ± 0.61	3.62 ± 0.58	2.08	<0.05
Homework Practice	Experimental Group	2.95 ± 0.72	4.12 ± 0.65	6.91	<0.01
	Control Group	2.98 ± 0.70	3.24 ± 0.68	1.56	>0.05

5.3 Comprehensive Quality Improvement Effect

The comprehensive quality questionnaire is an assessment tool developed based on the requirements for students' core competencies in the Ministry of Education's "Higher Vocational Education Professional Teaching Standards" (2019 Edition), combined with Cui Jiuchen's research findings from "Research on the Optimization of Higher Vocational Physical Education Evaluation System Based on Subject Core Competencies" [12]. The questionnaire includes the following three dimensions: (1) Teamwork ability: Evaluating students' communication, coordination, and mutual assistance skills in a team environment. (2) Problem-solving ability: Measuring students' ability to analyze and solve problems during basketball activities. (3) Psychological quality: Assessing students' psychological adjustment ability, resilience, and emotional control in competitive environments. This questionnaire underwent a

pilot test, with a reliability coefficient of 0.85, and validity test results showed that the factor loadings of all dimensions were greater than 0.7, indicating good psychometric properties.

Table 3 data reflects changes in comprehensive quality between the two groups of students. The experimental group showed significant improvement in the three dimensions of teamwork ability, problem-solving ability, and psychological quality ($p < 0.01$). In contrast, the control group showed a slight improvement in teamwork ability ($p < 0.05$), but the improvements in problem-solving ability and psychological quality did not reach statistical significance ($p > 0.05$). This indicates that the competitive teaching model effectively cultivated students' team spirit, problem-solving ability, and stress resistance by creating a real competitive environment, demonstrating clear advantages in improving students' comprehensive quality.

Table 3: Comparison of Comprehensive Quality Questionnaire Scores Between Experimental and Control Groups

Core Literacy Dimensions	Group	Pre-test (M±SD)	Post-test (M±SD)	t Value	p Value
Team Collaboration Skills	Experimental Group	3.42±0.67	4.56±0.54	7.63	<0.01
	Control Group	3.45±0.65	3.78±0.61	2.04	<0.05
Problem-solving ability	Experimental group	3.35±0.71	4.28±0.63	5.62	<0.01
	Control group	3.38±0.68	3.65±0.66	1.58	>0.05
Psychological quality	Experimental group	3.29±0.62	4.33±0.57	6.95	<0.01
	Control group	3.31±0.60	3.59±0.62	1.78	>0.05

6. Discussion

The results of this study indicate that the competition-based teaching model, oriented towards "learning through competition," has achieved significant effects in higher vocational basketball teaching. The experimental group showed clear advantages in three aspects: basketball skills, learning interest, and comprehensive literacy, verifying the effectiveness of the competition-based teaching model.

First, competition-based teaching significantly improved students' basketball skill levels, especially in spot shooting and passing accuracy, where the improvement was most notable. Competitive elements can stimulate students' potential and focus, promoting skill acquisition. In a competitive environment, students, aiming for better results, will actively increase their practice intensity, naturally accelerating skill improvement. Competition-based teaching effectively increased students' learning interest, with the most obvious difference seen in the extracurricular practice dimension. The frequency of after-class self-practice among the experimental group students significantly increased, indicating that competition stimulated intrinsic learning motivation. Competition-based teaching excels in cultivating comprehensive literacy, especially in teamwork and psychological quality. During competitions, students naturally develop communication and coordination skills by working together and solving problems; facing competitive pressure, students gradually enhance their psychological adjustment abilities. This supports the Ministry of Education's concept that vocational education should emphasize the cultivation of students' comprehensive abilities.

This study also has limitations. The sample size is small, and the experimental period was only one semester; long-term

effects need further verification. Additionally, differences in teaching resources between different schools may affect the universal applicability of the model. Future research should expand the sample range, extend the observation period, and explore its applicability under different teaching conditions.

7. Conclusion

This study verified the effectiveness of the competition-based teaching model for higher vocational basketball, oriented towards "learning through competition." This model, through a real competitive environment, enhanced students' skills, interest, and literacy, providing a feasible path for the reform of higher vocational physical education.

Competition-based teaching integrates "teaching, learning, practicing, and competing," transforming the traditional one-way indoctrination model and stimulating learning enthusiasm. In competition and cooperation, students not only master professional skills but also cultivate core professional literacy, aligning with modern vocational education goals.

Higher vocational physical education should further explore diversified competition formats, refine evaluation criteria, promote the overall improvement of teaching quality, and contribute to cultivating well-rounded technical and skilled talents.

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