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Design and Application Effect of Blended Learning Mode in Public Basketball Teaching in Colleges and Universities

Ying Xu, Huixin Xu, Rufei Cai
Hainan Vocational University of Science and Technology, Haikou, China

Abstract: This study aims to explore innovative approaches to improve the effectiveness of public physical education basketball courses in colleges and universities via the application of online and offline blended teaching mode. Based on theoretical analysis and systematic instructional design, this research constructs a complete teaching framework covering online learning resource development, whole-process implementation procedures and multi-dimensional evaluation system, and conducts empirical tests to verify its practical effects. The empirical results demonstrate that the proposed blended teaching mode can significantly improve students' mastery of specialized basketball skills, stimulate their autonomous learning initiative, and foster their team cooperation awareness, which presents prominent advantages over conventional offline teaching methods. In addition, students' overall satisfaction with basketball teaching procedures is remarkably enhanced. It is concluded that blended teaching provides a feasible and effective reform path for public basketball courses in higher education. Further optimization of this teaching mode requires collaborative improvements in teachers' information-based teaching competence, targeted teaching content development and intelligent teaching platform construction.

Keywords: Blended Teaching; College Public Basketball Courses; Instructional Design; Application Effect; Teaching Mode Optimization

1. Introduction

With the rapid advancement of educational informatization and the in-depth promotion of Internet-plus education philosophy, physical education teaching reform in colleges and universities faces both new opportunities and practical challenges. Dominated by offline classroom demonstration and centralized repetitive training, traditional basketball teaching mode is restricted by insufficient class hours, lack of personalized one-on-one guidance and single teaching form. Such limitations fail to meet diversified learning demands of college students and hinder the efficient acquisition of motor skills. By integrating the temporal and spatial flexibility as well as interactive advantages of online learning with the embodied practice and situational experience of offline physical courses, online-offline blended teaching mode breaks through the bottlenecks of conventional basketball teaching [1]. This research firstly sorts out the connotation and theoretical basis of blended learning, establishes a targeted instructional design framework suitable for college public basketball courses, and adopts empirical experiments to analyze the impacts of blended teaching on students' motor skill proficiency, learning motivation and comprehensive physical literacy [2]. The research findings are expected to provide theoretical references and practical support for teaching quality improvement and mode innovation of public physical education courses in colleges and universities.

2. Theoretical Basis and Concept Definition of Blended Teaching

2.1 Evolution of Teaching Modes and Core Connotation of Blended Learning

The reform of physical education teaching modes is closely correlated with information technology development and social educational demands. Traditional physical education teaching follows a teacher-centered and fixed-time-space teaching paradigm, in which teachers conduct on-site explanation, technical demonstration and organized group exercises throughout the whole class. Although this mode features intuitive offline teaching experience, it cannot accommodate individual differences among students due to limited class duration and

unified teaching progress. The popularization of mobile Internet and intelligent terminal devices promotes the emergence of digital online learning, which breaks the restrictions of time and space and provides abundant open learning resources for students. Nevertheless, pure online learning is not applicable for physical education courses that rely heavily on physical practice and real-time interpersonal interaction, as it easily causes disconnection between theoretical knowledge and physical training and delays teacher-student feedback. Blended learning emerges as an optimized integration of traditional offline teaching and pure online learning rather than a simple superposition of two teaching forms. In standardized blended teaching design, online courses are responsible for pre-class knowledge transmission, after-class resource expansion, independent preview and consolidation review, while offline classroom teaching focuses on motor skill refinement, scenario-based practical training, in-depth teacher-student interaction and instant targeted error correction [3]. This integrated teaching ecosystem rearranges all teaching elements based on curriculum objectives and student characteristics, making information technology serve practical teaching optimization instead of superficial form innovation. In public basketball teaching, pre-class cognitive learning of motor movements and tactical theories is completed on online platforms, and offline classroom time is fully reserved for high-intensity skill training and competitive tactical application, forming a closed-loop learning system covering preview, in-class practice and post-class review [4].

2.2 Core Theoretical Supporting Systems

The practical effectiveness of blended teaching is supported by three mainstream modern learning theories. Firstly, constructivism learning theory holds that learners acquire knowledge through active construction combined with personal existing experience and environmental interaction, rather than passive knowledge reception from teachers [5]. This theory lays a fundamental theoretical foundation for student-oriented blended teaching design, multi-scenario interactive activities including online thematic discussions and offline collaborative group training, and inquiry-based learning tasks. Secondly, humanistic learning theory emphasizes individual potential development and self-actualization, requiring teaching activities to respect students' subjectivity, emotional needs and personalized learning gaps. Blended teaching realizes hierarchical grouping training in offline classes and self-paced independent learning via diversified online resources, which fully responds to individual differences of students and promotes all-round development of every learner. Thirdly, self-efficacy theory indicates that learners' confidence in finishing specific learning tasks directly determines their learning persistence and internal motivation. Blended teaching improves students' basketball learning self-efficacy through repeated watching of standard technical demonstration videos online, progressive phased learning tasks, and positive instant feedback from teachers in offline classes. Collectively, the above three theories guide blended teaching to adhere to student-centered teaching concepts, strengthen interactive teaching links, support active knowledge construction and stimulate internal learning motivation, ensuring blended teaching is a scientific educational practice rather than a simple technical application [6].

2.3 Adaptability Analysis of Blended Teaching for College Public Basketball Courses

College public basketball courses are open to non-sports major students, facing three prominent teaching difficulties: obvious gaps in students' basketball foundation and sports interest, insufficient centralized class hours covering complete motor skill formation procedures, and scarce personalized demonstration and targeted guidance in unified offline classes [7]. The formation of basketball motor skills follows four progressive stages: cognitive establishment, movement imitation, repetitive intensive training and automatic skill application, among which standard movement cognition and sufficient practical training are indispensable. Blended teaching mode fits perfectly with the teaching characteristics and practical dilemmas of public basketball courses. High-definition decomposing technical videos and tactical animation resources on online platforms help students establish standard and accurate movement cognition before offline classes, and students can adjust learning progress according to their own foundation to balance individual learning differences. Correspondingly, offline classroom time is liberated from basic

knowledge explanation and can be allocated to refined motor skill correction, scenario-based tactical drills and high-intensity physical practice. Furthermore, basketball sports attach importance to team cooperation awareness and rule cognition cultivation [8]. Online collaborative learning tasks and offline group competitive activities in blended teaching provide continuous educational scenarios for cultivating students' comprehensive sports literacy. In general, blended teaching expands learning time and space, provides hierarchical personalized learning resources, standardizes students' initial movement cognition, and promotes the interactive integration of theoretical learning and physical practice, which is an effective solution to the long-standing problems of traditional public basketball teaching [9].

3. Systematic Design of Blended Teaching Mode for Public Basketball Courses

3.1 Design Principles and Overall Teaching Framework

The construction of blended teaching mode requires systematic overall planning following standardized design principles, instead of random combination of online and offline teaching activities. Four core principles are adopted in this research. The first is student subjectivity principle: all teaching links are designed to enhance students' active participation and meet personalized learning demands [10]. The second is teaching integrity principle: pre-class, in-class and post-class links are connected as an organic whole, ensuring logical coherence between online preview, offline practical training and post-class consolidation. The third is learning efficiency principle: all teaching activities aim at improving unit-time learning efficiency, utilizing online resources to make up for insufficient class hours and focusing offline classes on high-level motor skill internalization [11]. The fourth is practical operability principle: the teaching design fully considers practical campus conditions, including teachers' information-based teaching ability, students' intelligent terminal equipment coverage and school platform technical support capacity. Based on the above principles, the overall teaching framework is divided into three modules: pre-teaching front-end analysis, whole-process teaching activity design and multi-dimensional teaching evaluation system. Front-end analysis investigates students' basketball foundation, learning habits and information literacy, and clarifies key and difficult points of basketball teaching content. Whole-process teaching design refines online preview tasks, offline interactive practical activities and post-class extended learning arrangements. The multi-dimensional evaluation system runs through all learning stages, combining online learning behavior data, offline practical performance and final assessment results to realize dynamic teaching adjustment and mode optimization.

3.2 Online Learning Resource Development and Teaching Platform Selection

The quality of online learning resources determines the implementation effect of pre-class preview links in blended teaching. All online resources for public basketball courses are developed in accordance with motor skill formation rules and curriculum teaching objectives. Diversified multimodal resources are constructed, including multi-angle slow-motion decomposed technical demonstration videos for standard movement learning, dynamic tactical animation for cooperative running route explanation, graphic materials of basketball competition rules, classic match case analysis videos and targeted physical fitness training guidelines. Considering the lack of high-quality targeted online resources for basic basketball tactical teaching in current open network platforms, teachers need to screen existing network resources and independently produce targeted teaching videos matching the actual level of college non-sports majors. In terms of teaching platform selection, comprehensive platforms with stable resource carrying function, convenient task release and data statistical functions are preferred. Superstar Learning Platform is selected in this research for its high popularity in domestic colleges and universities, complete functions including online resource management, automatic homework collection, online knowledge tests, interactive discussion areas and visual learning data reports. The platform selection standard focuses on user convenience, functional matching with teaching design and clear learning data feedback for teachers' precise teaching.

3.3 Reconstruction and Optimization of Offline Classroom Teaching Activities

Offline classroom teaching has undergone fundamental functional changes in blended teaching system: it is no longer the main scenario for initial knowledge and skill explanation, but a core scenario for further skill internalization based on students' pre-class online learning foundation. All offline teaching activities are designed to connect closely with pre-class preview results and complement online learning links. At the beginning of offline classes, teachers omit repetitive basic movement explanation, and conduct targeted intensive demonstration and error correction aiming at common learning problems summarized from online platform preview data. Most offline class time is arranged for targeted refined training. For instance, students have mastered basic shooting movement cognition via online videos before class, so offline teaching focuses on correcting students' unreasonable force sequence, improving shooting stability and conducting one-on-one personalized movement guidance. In tactical teaching sessions, static online tactical knowledge is transformed into dynamic situational confrontation training, helping students master tactical application timing in real competitive scenarios. Besides, teachers transform their role from knowledge lecturers to professional coaches and learning observers. Teachers can record students' practical training videos via mobile tablets for instant playback and movement comparison analysis, realizing visualized and accurate teaching feedback. The optimized offline teaching mode concentrates limited offline classroom time on solving personalized learning difficulties, improving students' tactical application ability and strengthening team cooperative competence.

4. Implementation Procedures and Key Links of Blended Basketball Teaching

4.1 Pre-Class Online Preview and Cognitive Priming

The pre-class online preview link undertakes the core function of cognitive priming, requiring students to carry out autonomous exploratory learning rather than passive knowledge reception. Students watch targeted micro-teaching videos covering new technical movements and tactical running routes, and finish online guided questions and mini-knowledge tests to consolidate preliminary learning outcomes. The repeatable and slow-playable online video resources help students build accurate movement cognition, which makes up for the defect of one-time offline demonstration in traditional classes. Meanwhile, all online learning data including video viewing duration, test scores and discussion area questions are automatically recorded by the teaching platform. Teachers conduct big data analysis on overall preview performance to grasp class-wide common learning difficulties and individual learning gaps. Different from traditional experience-based lesson preparation, data-driven lesson preparation helps teachers clarify offline classroom teaching priorities, realize differentiated targeted teaching, and maximize the utilization efficiency of offline classroom time.

4.2 In-Class Offline Training and Motor Skill Internalization

In-class offline practical teaching is the core link of motor skill internalization, which must be closely connected with pre-class online preview results. Combined with preview data, teachers carry out targeted concentrated explanation aiming at universal learning difficulties, shortening basic explanation time and reserving sufficient time for physical training. Students are divided into hierarchical groups or heterogeneous cooperative groups according to their basketball foundation to carry out adaptive training. During the whole training process, teachers provide roaming one-on-one error correction and targeted technical guidance. Visual feedback teaching is adopted by recording students' training videos and comparing standard demonstration videos to help students intuitively recognize personal movement defects. Furthermore, small-scale simulated matches and situational tactical confrontation activities are arranged in class, guiding students to apply theoretical knowledge learned online to dynamic competitive scenarios. This link promotes the transformation of static theoretical cognition to automatic motor skills and on-site tactical decision-making ability, realizing effective internalization and migration of basketball skills.

4.3 Post-Class Online Consolidation and Knowledge Expansion

The post-class online learning link extends the whole learning chain and forms a complete closed-loop learning system. Students are

required to upload personal training videos and group cooperative match videos to the online platform after class for self-reflection and peer mutual evaluation. By observing training videos of themselves and classmates, students can objectively summarize movement deficiencies and deepen their understanding of key technical points. Teachers provide personalized text or voice feedback aiming at uploaded homework videos to point out students' progress and improvement directions. In addition, teachers launch extended thematic discussions on the platform, such as tactical case analysis of professional basketball matches and independent design of simple offensive cooperation tactics, to cultivate students' higher-order thinking ability. The teaching platform also pushes adaptive advanced learning resources intelligently based on students' learning performance, including difficult technical training videos, auxiliary physical fitness courses and basketball culture reading materials. Post-class online learning breaks the limitation of classroom teaching time and space, and promotes continuous consolidation of motor skills and improvement of students' comprehensive sports literacy.

5. Empirical Analysis on Practical Application Effects of Blended Teaching

5.1 Effects on Students' Specialized Basketball Skills and Physical Fitness

Controlled teaching experiments are conducted to verify practical teaching effects, dividing research objects into experimental group (blended teaching mode) and control group (traditional offline teaching mode). Experimental data show that students in the experimental group obtain significantly better results in specialized basketball skill tests compared with the control group, including higher fixed-point shooting accuracy and shorter time of half-court dribble layup. In terms of movement standardization evaluation, the experimental group presents more reasonable force sequence and better movement coordination due to complete pre-class online cognitive learning. However, there is no significant inter-group difference in basic physical fitness indicators including 50-meter dash and standing long jump. The experimental results indicate that blended teaching cannot directly improve students' basic physical quality, which relies on long-term quantitative physical load stimulation. Its core teaching advantage lies in optimizing motor skill learning procedures, improving training pertinence and accelerating the automatic formation of basketball motor skills.

5.2 Effects on Students' Learning Motivation and Affective Attitudes

Questionnaire surveys and semi-structured interviews are adopted to explore the non-cognitive teaching effects of blended teaching. Statistical results reveal that students in the experimental group gain significantly higher scores in sports learning motivation scale. Autonomous online learning mode reduces learning anxiety of students with weak sports foundation, and adequate pre-class preview helps students gain more sense of achievement in offline practical training, forming a virtuous cycle to stimulate internal learning motivation. Besides, blended teaching improves students' classroom participation and autonomous learning ability. Students put forward targeted questions actively in offline classes with clear preview objectives, and independent online learning tasks cultivate students' time management ability. Group cooperative training and peer mutual evaluation activities also strengthen students' team communication ability and collective responsibility. The positive changes in students' learning attitudes contribute to realizing the fundamental educational goals of physical education courses, including moral education and lifelong sports consciousness cultivation.

5.3 Effects on Students' Teaching Satisfaction and Curriculum Evaluation

Dual evaluation from students and teachers is conducted to assess the acceptability and promotion value of blended teaching mode. According to student satisfaction questionnaire data, over 90% of respondents recognize the advantages of blended teaching, including flexible autonomous online learning, efficient targeted offline training and fair process-oriented evaluation system. This teaching mode conforms to the digital learning habits of contemporary college students and enriches the overall form of public physical education courses. From teachers' perspective, blended teaching requires extra time for online resource production and preliminary teaching design in the early stage, but it reduces repetitive offline explanation work in the long run. Learning big data helps teachers

realize precise teaching intervention and improve targeted teaching efficiency. Meanwhile, teachers also point out existing challenges: blended teaching puts forward higher requirements for classroom organization ability and information-based teaching competence, and its popularization needs corresponding technical and policy support from colleges and universities. Overall, blended teaching obtains consistent positive feedback from both teachers and students, which supports its further promotion in college public basketball courses.

6. Optimization Strategies and Development Suggestions for Blended Teaching Mode

6.1 Improving Teachers' Information-based Teaching Competence and Instructional Design Ability

The popularization and optimization of blended teaching rely on teachers' role transformation and comprehensive ability improvement. Physical education teachers need to transform from simple platform operators to professional instructional designers and high-quality learning resource developers. On the one hand, teachers should master network resource screening and secondary editing skills, and produce targeted teaching videos fitting the cognitive level of non-sports major students. On the other hand, teachers need to improve overall curriculum design ability, realizing organic connection among pre-class preview, in-class training and post-class consolidation. Colleges and universities should build regular teacher training systems, carrying out special lectures on information-based teaching, open blended teaching observation courses and teaching case exchange seminars. Continuous professional training helps physical education teachers master theoretical logic and practical operation methods of blended teaching, and promote iterative optimization of teaching design in practical teaching.

6.2 Modularized Teaching Content and Personalized Learning Adaptation

To give full play to the personalized teaching advantages of blended learning, the overall basketball curriculum content is decomposed into four independent and interconnected modules: basic technical module, tactical cooperation module, physical fitness training module and basketball culture & rule module. Each module is divided into primary, intermediate and advanced difficulty levels to match students with different sports foundations. Supported by big data analysis technology, the online teaching platform pushes personalized learning tasks and adaptive resources automatically according to students' pre-class test results and daily learning performance. For example, students with poor dribbling foundation receive basic stationary dribbling training resources, while students with proficient basic skills obtain advanced combined dribbling challenge tasks. Modularized content design and intelligent personalized push balance unified curriculum teaching objectives and differentiated individual learning demands, effectively improving overall teaching efficiency and students' learning acquisition sense.

6.3 Upgrading Intelligent Teaching Platform and Whole-process Evaluation System

Intelligent teaching platform and scientific evaluation system are two important technical guarantees for in-depth development of blended teaching. Future basketball teaching platforms need to upgrade from basic course management tools to intelligent integrated learning environments, adding automatic motor skill trajectory analysis function, real-time physical training data monitoring and one-stop interactive feedback function. The platform can generate visualized student learning portraits for teachers to conduct accurate teaching intervention. Correspondingly, the traditional single final skill assessment system should be replaced by a whole-process multi-dimensional comprehensive evaluation system. The optimized evaluation system integrates online learning behavior data, offline classroom practical performance, final skill assessment results, theoretical test scores and physical fitness test indicators, adopting multiple evaluation subjects including teachers, peers and students themselves. The new evaluation system realizes comprehensive and objective learning effect assessment, and provides positive phased feedback to stimulate students' continuous learning enthusiasm.

7. Conclusion

This research systematically analyzes the theoretical connotation, overall design, implementation procedures and practical effects of blended teaching mode applied in college public basketball courses. The research results

verify that online-offline blended teaching mode has high feasibility and application value in public basketball teaching. It effectively solves prominent problems of traditional basketball teaching including limited class hours, single teaching form and insufficient personalized guidance, and promotes the improvement of students' specialized basketball skills, autonomous learning ability and team cooperation consciousness. Nevertheless, the stable operation of blended teaching requires joint guarantee from teachers' information-based teaching ability, high-quality online resource construction and intelligent whole-process evaluation system. In future research and teaching practice, college public basketball blended teaching should develop towards refinement, personalization and intellectualization, strengthen mutual promotion between theoretical research and practical teaching, and provide more innovative teaching support for cultivating college students with lifelong sports exercise habits and comprehensive physical literacy.

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