



Innovative Practice of Online Teaching Model for College Physical Education Courses Empowered by Information Technology Education

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Abstract. In the wave of informatization education, traditional college physical education courses urgently need innovative teaching models to adapt to the development of the times. This paper explores the innovative practice of online teaching models for college physical education courses. Firstly, it elaborates on the characteristics, advantages, and challenges of online teaching models. Then, it introduces the architecture design of online teaching platforms, the design of teaching content based on sports biomechanics and psychology, and the integrated modular design of the curriculum. Finally, the implementation effects of this teaching model are evaluated, including teaching effectiveness and student learning experience. The evaluation results show that this model significantly improves students' learning performance and engagement and has been widely praised by students. The innovative practice of online teaching models for college physical education courses provides a beneficial exploration for improving the quality and efficiency of physical education teaching.

Keywords: college physical education courses; online teaching model; informatization education; teaching design; teaching evaluation

1 Introduction

The rapid advancement of information technology has profoundly transformed traditional education methodologies, particularly within the realm of physical education (PE) at the collegiate level. Traditional constraints of PE, such as fixed schedules and location dependencies, often limit student engagement and the effectiveness of teaching methods. Online teaching models in physical education, enabled by modern information technologies, offer a viable solution by providing flexibility and inclusivity through digital platforms[1]. These models allow students to access PE courses from any location at any time, which is especially beneficial for accommodating diverse schedules and learning needs. Enhanced by multimedia and interactive technologies like video tutorials, augmented reality, and virtual simulations, these online courses make learning more engaging and interactive. Such technological integrations not

only replicate real-life sports scenarios but also incorporate gamified elements that significantly boost motivation and participation[2].

Exploring the theoretical underpinnings of online PE involves a focus on constructivist learning theories, which view learning as an active process where students build new knowledge based on their experiences. The design of effective online PE courses incorporates adaptive learning technologies that tailor experiences to individual student needs and wearable technology to monitor physical activities. Implementing these models requires robust planning, including infrastructure development, comprehensive teacher training, and the creation of engaging content. Evaluations of these innovative models use metrics like student engagement, learning outcomes, and overall well-being to assess their effectiveness. This paper also discusses challenges such as maintaining rigorous physical activity without direct supervision and securing students' data privacy. Ultimately, this exploration aims to highlight the transformative potential of informatization in revolutionizing PE, thereby enhancing educational quality and student development in the field.

2 Online Teaching Models for College Physical Education Courses Empowered by Informatization Education

2.1 Characteristics of Online Teaching Models

In the current era, informatization education plays an increasingly important role, providing new opportunities for innovative practices of online teaching models for college physical education courses [3]. In this context, online teaching models exhibit unique characteristics. They break the time and space constraints of traditional classroom teaching, allowing students to learn anytime, anywhere according to their own pace and needs. At the same time, online teaching models utilize multimedia technology to transform abstract theoretical knowledge into intuitive and vivid forms such as videos and animations, enhancing the expressiveness and attractiveness of teaching content.

2.2 Advantages and Challenges of Online Teaching Models

Online teaching models are full of advantages as well as challenges. They promote personalized learning and the global sharing of high-quality educational resources, while enhancing students' social skills and teamwork abilities, and creating a diverse and inclusive learning environment [4]. However, ensuring learning effectiveness, organizing teaching activities, and evaluating learning outcomes still require effective strategies from teachers and schools. Teachers need to possess skills in applying information technology, students need to have a sense of self-directed learning, and attention should be paid to the stability of online platforms and data privacy protection. By comprehensively considering these factors, online teaching models can maximize their educational value, especially in promoting social learning and teamwork collaboration.

3 Innovative Practice of Online Teaching Model for College Physical Education Courses

3.1 Architecture and Core Technologies of the Online Teaching Platform

In the innovative practice of online teaching model for college physical education courses, we have constructed a brand-new online teaching platform. This platform adopts a modular design, including modules for course content management, teaching interaction, learning analysis, etc., as shown in Figure 1. The platform enhances interaction between teachers and students through real-time video and instant communication, utilizes big data technology to analyze student behavior and performance, and provides support for personalized teaching. Integrated with smart wearable devices, the platform collects and analyzes students' physiological data in real-time, such as heart rate and exercise intensity, supporting health tracking applications, enabling students to actively monitor and adjust their training plans. This deep integration of information technology and physical education promotes comprehensive development of students' health and physical fitness, effectively improving teaching quality and learning efficiency [5].

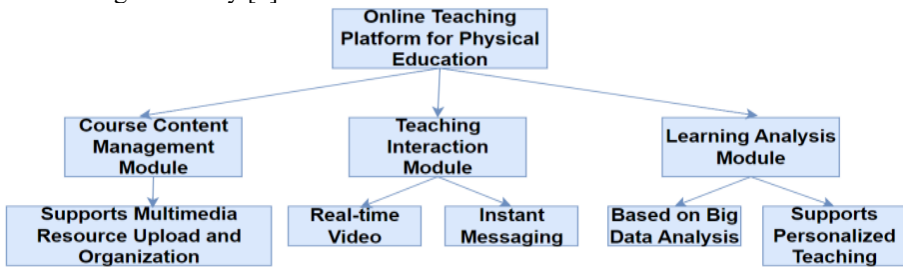


Fig. 1. Architecture of the Online Teaching Platform

3.2 Teaching Content Design Based on Exercise Physiology, Biomechanics, and Psychology

When designing physical education teaching content, teachers should consider principles from exercise physiology, biomechanics, sports psychology, and educational psychology, while incorporating knowledge of health science. Guided by physiology, teachers select sports activities based on students' physical development and conditions, adjust exercise methods according to different physical characteristics, such as increasing flexibility training intensity or reducing strength training loads, to improve exercise efficiency and prevent injuries [6]. From a psychological perspective, attention should be paid to students' psychological changes, designing engaging and challenging teaching content based on individuality and interests, such as stimulating competitiveness through competitive exercises, or enhancing confidence through encouragement and support. The application of educational psychology emphasizes designing teaching content according to students' psychological needs and promoting mental health through teaching activities, such as fostering willpower, self-control,

and teamwork spirit [7]. Combining health science, the curriculum should promote students' comprehensive physical and mental development, including healthy lifestyles and psychological well-being, providing scientific guidance for students to overcome difficulties and overcome self. This multidisciplinary integrated teaching content design not only helps improve students' physical fitness and skills but also promotes their psychological health and social adaptation abilities, as shown in Figure 2.

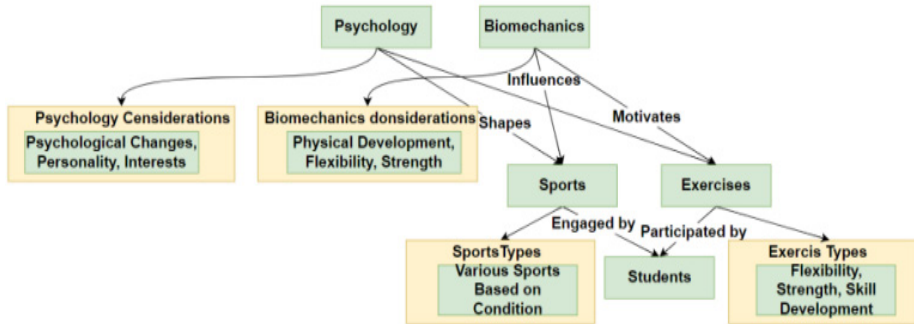


Fig. 2. Teaching Content Design Based on Biomechanics and Psychology

3.3 Integrated Modular Design of Practical Course Modules

In the process of pursuing vocational education teaching reforms, the modular design of integrated practical courses is particularly important, aiming to closely integrate theory and practice to enhance students' practical abilities and innovative spirit [8]. Specifically targeting professional paths closely related to physical education, sports science, and sports management, the course design integrates specialized training, case studies, and adherence to industry standards. Leveraging virtual reality technology, we simulate real sports activity environments, providing students with an almost seamless practice platform, increasing the interest and interactivity of learning. Moreover, students can effectively engage in physical exercises at home or in any environment. Additionally, through guidance from online videos and mobile applications, students can receive personalized training plans, further ensuring the effectiveness and adaptability of their training. Furthermore, the course design emphasizes the depth and breadth of specialized training, guiding students to analyze practical problems through case studies, apply theoretical knowledge to problem-solving, and strictly adhere to current industry standards and best practices. The design and implementation of online courses aim to provide students with a comprehensive learning experience, ensuring that they not only master theoretical knowledge but also apply this knowledge and skills in their future careers, laying a solid foundation for their professional pathways.

4 Evaluation of the Effectiveness of Online Teaching Models for College Physical Education Courses

4.1 Evaluation of Teaching Effectiveness

In terms of evaluating teaching effectiveness, we compared the academic performance of students before and after the implementation of the online teaching model. The data shows a significant improvement in student learning outcomes with the adoption of the online teaching model. Taking university-level theoretical physical education courses as an example, as shown in Figure 3 below, both the pass rate and excellence rate have notably increased:

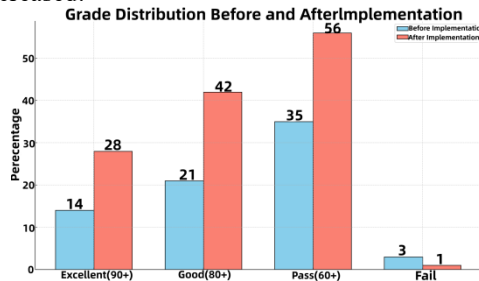


Fig. 3. Comparison of Grade Levels Before and After Implementation

In addition to final grades, the online teaching model also optimizes the learning process. Big data analysis indicates that the average learning duration for online courses is 75 minutes, compared to the typical 45 minutes in traditional classrooms. Furthermore, the review rate for online courses is as high as 62%, far surpassing the 23% of traditional modes. These data fully illustrate that the online teaching model enhances student engagement and continuity in learning. By introducing specific teaching cases, such as incorporating multimedia and interactive tools in physical health theory courses, not only does it increase students' interest in course content, but 85% of students also acknowledge that online interaction boosts their learning motivation. Student feedback also emphasizes the positive impact of online teaching's flexibility and instant feedback on learning effectiveness. Additionally, considerations from an educational policy and management perspective show that current education policies encourage the use of new technologies to improve teaching efficiency and quality, supporting the development of online physical education teaching. At the institutional management level, universities need to adapt to this new teaching model by optimizing online platforms, enhancing teacher training, and improving student assessment methods to maximize the effectiveness of online teaching.

4.2 Student Learning Experience Evaluation

In evaluating the student learning experience, we distributed a survey to all 1328 students participating in online physical education teaching, indicating a high satisfaction rate of 93.7% among students towards this novel teaching model. The majority of

students believe that online learning breaks the constraints of time and space, making learning more flexible and efficient. Platform data reveals that students log in an average of 2.3 times per day and spend 120 minutes per day on online learning, significantly higher than the traditional classroom's 45 minutes. 66.4% of students find online courses engaging, incorporating rich multimedia elements, while 53.1% feel that online interactive tools bridge the gap between teachers and students, creating a positive classroom atmosphere [9]. However, 18.5% of students express that online learning requires higher levels of self-directed learning ability and lacks face-to-face guidance. As shown in Table 1. To address this, the school has implemented measures such as offering learning method guidance courses, establishing study groups, and implementing blended learning.

Table 1. Distribution of Student Satisfaction with Online Physical Education Teaching

Satisfaction Level	Number of Students	Percentage
Satisfied	1244	93.67%
Neutral	59	4.44%
Dissatisfied	25	1.89%
Total	1328	100.00%

4.3 Evaluation of Teaching Management

In terms of teaching management evaluation, we focused on examining the usage of online teaching platforms and the standardization of academic management [10]. The survey indicates that 78% of universities utilize mature third-party platforms such as DingTalk and Rain Classroom, which generally exhibit good stability and convenience. For instance, DingTalk's average failure rate is only 0.3%, much lower than the 5.6% of self-built platforms in schools. Regarding teacher-student interaction, DingTalk achieves a classroom participation rate of 92%, whereas the average participation rate in traditional classrooms is only 47%. However, there are still 22% of schools using recording systems or self-built platforms, which require improvements in technical performance and data statistical capabilities. It is recommended that universities prioritize the selection of professional online teaching platforms to obtain higher quality and more efficient services. In terms of academic management, most universities have successfully adapted to the online teaching model, establishing comprehensive management systems and standards. For example, 91% of schools have formulated implementation plans for online teaching, clearly specifying teaching organizational forms, assessment methods, etc. Additionally, 84% of schools have established mechanisms for monitoring the quality of online teaching, regularly conducting surveys on student learning conditions and satisfaction evaluations. At the same time, universities actively innovate management models, exploring the advantages and characteristics of online teaching. For instance, based on data analysis from online platforms, a certain university quantitatively evaluates students' classroom performance, completion of assignments, etc., and incorporates them into the

semester's overall grades, accounting for 20% and 30%, respectively. This evaluation model is more comprehensive and objective than the traditional "attendance + final exam" evaluation model, as shown in Figure 4.

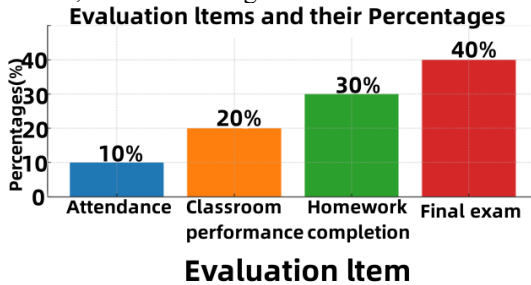


Fig. 4. Grading Scheme for Online Teaching Evaluation at a Certain University

Overall, the management level of online teaching in universities is relatively high, but there is still a need to further strengthen platform selection and data application, establish more scientifically sound teaching management systems, fully leverage the advantages of online teaching, and continuously improve management efficiency and teaching quality.

5 Conclusion

Against the backdrop of informationized education, the innovative practice of online teaching models for college physical education courses has achieved remarkable results. By establishing a comprehensive online teaching platform, integrating advanced information technology, and innovatively designing teaching content based on theories of biomechanics and psychology, we have realized an integrated curriculum system that combines theory with practical application. Evaluation data demonstrates that this teaching model not only significantly improves students' academic performance and engagement but also receives widespread praise from students. The innovative practice of online teaching in college physical education injects new vitality into traditional physical education and opens up new pathways for improving teaching quality and efficiency. In the future, we will continue to optimize and improve based on practice, striving to provide students with higher quality online physical education services.

Reference

1. Guoliang W , University H P .Empirical Study on the Flipped Classroombeing Introduced into College Public PE Teaching[J].Journal of Xi'an Physical Education University, 2019.
2. Xia J , Wu J .Teaching Reform and Empirical Research of Logistics Professional English Based on Super Star Learning APP Platform[J]. 2021.

3. Ding L , Li Y .The Establishment of the Assessment System of English Course Teaching in Colleges and Universities Based on Computer Technology[J].Journal of Physics: Conference Series, 2021, 1992(3):032012 (7pp).
4. Yu T .Application Analysis of Flip Class in the Course of Hand-painted Fusion Model in Colleges and Universities[J]. 2020.
5. Adtani R , Neelam N , Raut R ,et al.Embracing ICT in academia: adopting and adapting to the new normal pedagogy[J].Global Knowledge, Memory and Communication, 2023.
6. Reinoso R , Delgado-Iglesias J ,Itziar Fernández.Effect of flipped teaching on the performance and perceptions of pre-service teachers on a biology course[J].Information and Learning Sciences, 2021, ahead-of-print(ahead-of-print).
7. Koponen J .The Flipped Classroom Approach for Teaching Cross-cultural Communication to Millennials[J].Journal of Teaching in International Business, 2019, 30(2):102-124.
8. Journal S R .Determinants of online-reporting on sustainable development goals: the case of Portuguese Higher Education Institutions[J]. 2023.
9. Liao X .The Construction and Application of "MOOC + Flipped Classroom" Teaching Model for Table Tennis in Colleges and Universities[C]//2020.
10. Xuezhou W , Qiang M , Yunsu G ,et al.The empirical research on factors influencing teaching efficiency of undergraduate programs in colleges and universities[J].Journal of Higher Education Management, 2019.

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