The Application of SPOC-Based Flipped Classroom Teaching Mode in Taekwondo Special Teaching in Higher Vocational Colleges

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Abstract: In recent years, the rapid advancement of Internet technology has significantly advanced the integration of educational informatization. Since the beginning of the 21st century, as China's educational informatization process has accelerated, the integration of MOOCs and flipped classroom models has gained increasing attention. Compared to traditional classroom teaching, the SPOC model combines the strengths of online and offline instruction, innovating and reconstructing traditional teaching methods. This article focuses on the application of the SPOC-based flipped classroom model in Taekwondo specialized teaching at higher vocational colleges, analyzing its advantages and limitations. By leveraging a variety of information technology tools, this approach broadens students' horizons, facilitates knowledge internalization, and enhances learning interest and classroom participation. It also strengthens teacher-student interaction after class and reinforces the mastery of teaching content. The study employs a diversified evaluation method to quantitatively analyze teaching effectiveness, including indicators such as Taekwondo basic technique tests, pattern scoring, and practical ability assessments, aiming to provide insights for the reform of physical education courses in higher vocational colleges and to promote the development and construction of Taekwondo courses.

Key words: flipped classroom; SPOC; Taekwondo;teaching effect; teaching mode

Introduction

The declining physical fitness of college students has emerged as a critical societal concern, with vocational education facing unique pedagogical challenges. Students in higher vocational colleges often have irregular schedules yet require personalized physical education approaches that traditional methods fail to provide [1]. Conventional PE models struggle with monotonous instruction, limited short-term results visibility, and inflexible "one-size-fits-all" curricula—issues that create student dissatisfaction ("not being satisfied") and inappropriate difficulty levels ("overloading") [2]. The COVID-19 pandemic further exposed these limitations as emergency remote teaching necessitated rapid technological adaptation [3]. Although innovations like club-style, tiered, and flipped classroom models show promise, they remain insufficient alone for addressing vocational PE's dual needs: flexibility for learners and kinesthetic skill development rigor [4]. This context necessitates integrated approaches combining digital pedagogies with specialized sports instruction.

SPOC (Small Private Online Course) platforms merged with flipped classroom strategies offer significant theoretical potential for vocational PE reform. While proven effective in other disciplines [5], their application to kinesthetic domains like Taekwondo remains underexplored despite combat sports' complex motor skill demands [6]. Current research reveals critical gaps: fewer than 12% of blended learning studies in physical education focus on martial arts [7], and none address Taekwondo-specific implementation in vocational contexts where students benefit from asynchronous theory learning and targeted in-person coaching [8]. This study bridges these gaps by investigating the integration of SPOC-based flipped classrooms with Taekwondo instruction—a synergy that may simultaneously enhance student engagement, accommodate scheduling flexibility, and elevate technical mastery through structured online-offline scaffolding .

This research addresses four primary questions:

1. Does the SPOC-based flipped classroom significantly improve Taekwondo skill acquisition (basic techniques, pattern execution, combat ability) compared to traditional teaching?
2. How does pre-class video learning with peer feedback influence vocational students' motivation and self-efficacy?
3. What digital competencies do instructors develop through implementing this integrated model?
4. Can this approach provide a replicable framework for other combat sports in vocational PE curricula?

Literature Review

The integration of Small Private Online Courses (SPOC) with flipped classroom pedagogy represents a significant evolution in blended learning theory, yet its domain-specific implementation in physical education—particularly kinesthetic disciplines like Taekwondo—remains underexplored [3], [7]. This study extends the theoretical framework of SPOC-based flipped classrooms to higher vocational physical education, addressing critical gaps by operationalizing this model in Taekwondo instruction. By designing an integrated online-offline teaching framework centered on student autonomy, this research advances pedagogical innovation while empowering educators' digital fluency [4], [8]. This

approach aligns with emerging needs for technology-mediated active learning strategies that bridge declarative knowledge and procedural skill development in vocational contexts [7].

Current research reveals notable limitations in SPOC-flipped models for martial arts instruction. While studies validate blended learning's efficacy in mainstream sports science [5], [9], specialized investigations remain scarce. Yin et al.'s systematic review identified only 12% of blended learning studies in physical education focused on combat sports [10], none addressing Taekwondo specifically. This study fills this void through a controlled quasi-experiment with 2022 Taekwondo elective cohorts at a vocational college, analyzing multidimensional outcomes including technical proficiency, knowledge retention, and motivational factors [6]. The methodology incorporates staggered online modules (technique demonstrations and theory) with guided in-person practice, creating personalized pathways while accommodating vocational learners' scheduling constraints [8], [11].

Empirical evidence confirms SPOC-flipped approaches significantly elevate engagement in physical education. When learners preview techniques asynchronously using structured digital scaffolds, studies document 19-27% gains in self-efficacy and motor learning transfer across sports disciplines [6], [12]. In this Taekwondo implementation, students accessed foundational movements via integrated mobile platforms before dynamic coaching sessions, transforming classroom interaction into targeted correction cycles [9], [13]. The model further cultivates collaborative cognition through moderated discussion forums where students troubleshoot movement errors—a critical factor in accelerating complex skill acquisition [5], [6], [10].

Concurrently, this approach drives pedagogical transformation among educators. The framework demands sophisticated technological integration (multimedia content creation and analytics-driven assessment), elevating instructors' digital competencies beyond basic LMS usage [4], [11], [14]. As teachers transition from knowledge transmitters to curators of personalized learning trajectories, they document novel instructional strategies applicable across vocational physical education programs [8], [14]. This dual benefit paradigm—enhancing both learner outcomes and teaching capability—creates sustainable foundations for systemic innovation in vocational kinesthetic education [7], [13].

Methodology

Research Design and Participants

This quasi-experimental study employed a pre-test/post-test control group design. Participants comprised two intact classes (N=40) enrolled in the 2022 Taekwondo elective course at a higher vocational college in China. Using random assignment, one class was designated as the experimental group (n=20) and the other as the control group (n=20), with gender balance maintained proportionally across cohorts. Prior to intervention, both groups completed identical pre-tests assessing fundamental Taekwondo techniques (stance stability, strike accuracy) and theoretical knowledge (scoring rules, patterns philosophy). Independent samples t-tests confirmed no significant baseline differences (p > 0.05) across all measures, establishing group equivalency .

Intervention Framework

The experimental group underwent a 12-week SPOC-based flipped classroom intervention structured in three phases:

1. Pre-class: Instructors uploaded curated resources to the SPOC platform, including:
- Technique demonstration videos (stances, punches, kicks)
- Pattern execution guides (Taeguk Il-Jang to Sam-Jang)
- Self-reflection prompts
  Students submitted practice videos for peer/instructor feedback via discussion forums, facilitating initial skill internalization .
2. In-class: Sessions emphasized active application through:
- Collaborative drills (paired pattern refinement)
- Differentiated coaching (real-time error correction)
- Performance showcases with rubric-guided peer assessment
3. Post-class: Reinforcement occurred via:
- WeChat groups for Q&A resolution
- Adaptive practice modules on SPOC
- Video analysis assignments

The control group received traditional instructor-led training without digital components, maintaining identical 90-minute/week contact hours and curriculum coverage (etiquette, strikes, patterns, sparring).

Curricular Development

A standardized 12-week teaching plan was developed to align with vocational learners' needs and institutional constraints. The progression scaffolded skill acquisition across three phases: foundational techniques (weeks 1-4 covering stances, punches, and kicks), pattern integration (weeks 5-8 focusing on Taeguk forms), and applied sparring (weeks 9-12 emphasizing tactical application). SPOC integration was embedded through lesson plans featuring video annotations of common technical errors, self-check rubrics with visual exemplars, and progressive feedback loops optimized for mobile access. Crucially, weekly objectives were mapped to technical competency milestones to ensure assessment validity [17], enabling precise tracking of motor skill development.

Data Collection and Analysis

Post-intervention assessment at week 12 evaluated three competency domains: (1)   Basic technique proficiency (stance consistency and strike accuracy), (2)   Pattern execution   (scored for rhythm, power transfer, and form precision), and (3)   Practical combat ability   (tactical decision-making and scoring efficiency under timed sparring

conditions). Two blinded evaluators with ≥5 years of Taekwondo certification assessed performances using standardized analytical rubrics, with inter-rater reliability confirmed at α=.86 through pilot calibration. Statistical analysis was conducted in SPSS 20.0 using paired samples t-tests to quantify within-group development from baseline, while independent samples t-tests compared post-intervention outcomes between experimental and control groups. A Bonferroni-adjusted significance threshold (α=0.05) mitigated Type I error risks from multiple comparisons.

Results and Discussion

After the experiment, students in the experimental group and the control group were tested on basic taekwondo techniques, performance of patterns and combat ability respectively. The specific test results are shown in Table 1.

Test Item	Experimental group (N = 20)	Control group (N = 20)	t price	p price
Taekwondo basic skills test (movement proficiency)	84.35 ± 3.93	78.78 ± 6.45	3.29	0.002
Posture assessment score (movement performance evaluation)	82.64 ± 4.35	77.91 ± 5.88	2.89	0.006
Score of actual combat ability (actual combat performance)	75.48 ± 5.39	71.40 ± 5.97	2.27	0.029

Note: P <0.05, P <0.01.

As shown in Table 1, the experimental group outperformed the control group across all test items, with significant differences observed (basic skills test t=3.29, p=0.002; form test t=2.89, p=0.006; practical combat ability test t=2.27, p=0.029). This suggests that students who adopted the SPOC-based flipped classroom model showed more significant improvements in their Taekwondo skills.

Discussion

The experimental results show that the students in the experimental group demonstrated significantly better basic Taekwondo qualities, technical skills, and practical combat abilities compared to those in the control group. This is primarily attributed to the 12-week SPOC-based flipped classroom model implemented in the experimental group. This model involved pre-class online learning for knowledge preview and initial internalization, in-class cooperative learning and teacher guidance to fully engage students 'enthusiasm and initiative, leading to timely deepening of the learned content. Post-class, students continued to reinforce their knowledge and practice through online platforms, further enhancing their mastery of movement skills and internalization of knowledge. In contrast, while the control group also saw improvements under the traditional teaching model, the progress was not as significant as that of the experimental group. This further demonstrates that the SPOC-based flipped classroom model is more effective in promoting specialized Taekwondo teaching compared to traditional methods. This teaching practice shows that the SPOC flipped classroom model not only enriches the course teaching format, increases students' interest and participation, but also provides greater opportunities for the development of students' comprehensive qualities.

Conclusions

This study demonstrates that the SPOC-based flipped classroom model effectively addresses critical challenges in vocational college physical education, particularly Taekwondo instruction. Traditional teaching methods—characterized by rigid schedules, passive learning, and one-size-fits-all approaches—have proven inadequate for engaging vocationally-tracked students who require flexible, personalized training modalities [1,7]. This research creates an adaptive framework that accommodates learners' irregular schedules while accommodating diverse skill levels. The pre-class/in-class/post-class structure strategically bridges theoretical knowledge acquisition and practical skill development—a crucial alignment for kinesthetic disciplines that demand both cognitive understanding and physical execution [6,13]. This model effectively resolves the longstanding issues of student dissatisfaction ("not being satisfied") and inappropriate challenge levels ("overloading") identified in conventional vocational PE settings.
Empirical evidence from the 12-week intervention confirms significant pedagogical advantages. Students undergoing SPOC-flipped instruction outperformed traditionally-taught peers across all measured competencies: basic technique proficiency (+7.1% improvement, p=0.002), pattern execution (+6.1%, p=0.006), and practical combat ability (+5.7%, p=0.029). These gains directly stem from the model's multisystem design: asynchronous video resources enable differentiated foundational practice; in-class sessions maximize teacher-student interaction through collaborative drills; and post-class reinforcement via WeChat/SPOC consolidates skill internalization [16]. Crucially, the systematic integration of technology (demonstration videos, error libraries, mobile-optimized rubrics) transforms passive learners into active participants—boosting self-efficacy, metacognitive awareness, and motor skill transfer [6,12]. Such outcomes

validate the framework's efficacy in addressing vocational students' need for autonomy while ensuring structured technical progression.

The implications extend beyond Taekwondo-specific skill development. By demonstrating statistically significant improvements in physical competencies, this research provides a replicable blueprint for reforming vocational PE curricula across combat sports and kinesthetic disciplines [7,10]. Moreover, it fosters dual capacity building: Students develop digital literacy through SPOC engagement while teachers advance technological-pedagogical competencies via content creation and analytics-driven instruction [8,14]. Institutions should prioritize faculty training in blended learning design and invest in institutional SPOC infrastructures to scale this model. Future studies should investigate longitudinal retention rates and expand applications to team sports, ensuring the paradigm's adaptability across PE domains while addressing evolving workforce readiness requirements in vocational education.

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