

An Empirical Study on Flipped Classroom in College Physical Education Theory Courses

Jianzhong Sun^{1,2}, Yintao Niu^{1,2}, Lei Wang^{3*}

¹School of Physical Education, Chizhou University, Chizhou, China

²Sports Health Promotion Center, Chizhou University, Chizhou, China

³Students Affairs Office, Chizhou Vocational and Technical College, Chizhou, China

Email: *1027346768@qq.com

How to cite this paper: Sun, J. Z., Niu, Y. T., & Wang, L. (2024). An Empirical Study on Flipped Classroom in College Physical Education Theory Courses. *Creative Education*, 15, 153-163.

<https://doi.org/10.4236/ce.2024.152008>

Received: January 5, 2024

Accepted: January 30, 2024

Published: February 2, 2024

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Abstract

The flipped classroom approach centers on students, shifting their mindset from “I have to learn” to “I want to learn”, and reshaping the traditional classroom’s teaching modality from indoctrination to one of interactive engagement. This article examines the practical impact of implementing the flipped classroom in the theoretical courses of the School of Physical Education at Chizhou University. We employ innovative teaching methods such as student-led PowerPoint presentations, group discussions, and student evaluations to assess its effectiveness. Our findings indicate that the flipped classroom model is well-received and embraced by the majority of students. It not only fosters greater teacher-student interaction but also enhances student participation and learning outcomes. At the same time, students provided their own opinions and suggestions on the future development direction of flipped classroom. In traditional teaching, knowledge is primarily imparted to students within the classroom, with the expectation that they will consolidate and apply this knowledge outside of class. Conversely, flipped classrooms utilize various forms of information technology to enable students to engage in self-study prior to class, identify problems, and learn through questioning. Inside the classroom, teachers act as guides, providing direction and answering questions to facilitate personalized learning experiences for students. This approach cultivates their ability to learn and self-study effectively.

Keywords

Flipped Classroom, Sports Ethics, Empirical Research

1. Introduction

The conventional classroom dynamic, characterized by teacher-led lectures and

passive student listening, tends to diminish student enthusiasm and quash their desire for knowledge acquisition (Guerra et al., 2022; Onele, 2023; Jia et al., 2023; Diab-Bahman et al., 2022; Ornager, 2022). The fundamental problem in education lies in the lecture-centric approach where teachers “efficiently” disseminate knowledge, inadvertently replacing student-led learning with teacher-led instruction. This leads to a decline in students’ interest and passion for exploring knowledge, resulting in limited teacher-student interaction, reduced student engagement, and consequently, ineffective classroom sessions. Yan & Huang argue that despite its prevalence in higher education, the traditional classroom model has seen a notable decline in teaching quality and student satisfaction. They advocate a shift from the didactic, teach-first-learn-later model to a more experiential form of teaching (Yan & Huang, 2023). The flipped classroom paradigm, which relegates new knowledge acquisition to self-study outside the classroom and utilizes class time for practice and problem-solving, has been explored in various contexts. Hu et al. implemented flipped classroom and case-based learning methods in medical education (Hu et al., 2023); Fan adapted it for university-level swimming courses (Fan, 2023a); Fan integrated it into air volleyball teaching practices in colleges (Fan, 2023b); Wang employed a micro-lesson based flipped classroom approach in physical education reform (Wang, 2018). The flipped classroom model has shown distinct advantages over traditional methods in both specialized and general physical education courses (Aladl, 2023; Abou-Zamzam et al., 2023). However, research on its effectiveness in theoretical physical education courses is limited. This study aims to empirically examine the efficacy of the flipped classroom teaching model in the context of physical education ethics courses.

2. Study Participants and Methodology

2.1. Study Participants

In the duration from September to December 2023, as part of the theoretical courses in the Sports College, a group of 120 sophomore students from the Leisure Sports major at Chizhou College were selected for this study. Prior to the commencement of the experiment, the participants were briefed about its purpose and methodology, and it was emphasized that their involvement was entirely voluntary. The theoretical course was scheduled once a week, comprising 2 hours per session, over a span of 16 weeks, amounting to a total of 32 hours. The study received approval from the Physical Education and Health Promotion Center of Chizhou College and adhered to the ethical standards for human experimentation.

2.2. Methodology

2.2.1. Experimental Design and Execution

The study involved 120 participants and began at the end of August 2023. The

initial two weeks were dedicated to traditional classroom instruction, characterized by teacher-centric lectures and students in a passive listening role. This was followed by a 12-week period of implementing the flipped classroom model, centering on student engagement, with students delivering the presentations and teachers offering critiques. In preparation for the flipped classroom sessions, students were notified a week in advance about who would be presenting and the topics to be covered, giving them sufficient time to develop their PowerPoint presentations outside class hours. These presentations could be prepared individually or in groups, although only one student would lead the presentation. Additionally, the model incorporated group discussions, with an emphasis on student-driven learning and teacher facilitation.

2.2.2. Evaluation of the Flipped Classroom

In the 15th week at the end of December 2023, a paper-based survey was carried out to evaluate the impact of the flipped classroom approach. Out of 120 distributed questionnaires, 111 were promptly collected, resulting in a collection rate of 92.5%.

2.2.3. Statistical Analysis Method

The acquired data was analyzed using SPSS 25.0 software. The primary method involved frequency analysis to evaluate student feedback on the flipped classroom experience. Additionally, the Chi-square test was employed to examine variations in student attitudes regarding the effectiveness of the flipped classroom model.

3. Analysis of Research Findings

3.1. Understanding of the Flipped Classroom among College Students

The prevailing mode of instruction for theoretical courses in higher education remains the traditional approach, with the teacher conducting lectures for the entire class and students participating in a passive manner, while teacher-student interaction is largely limited to teacher-initiated questioning. This study's participants, having engaged in the flipped classroom method for almost a semester, were surveyed on their experiences. This survey contrasted their initial traditional classroom exposure at the semester's start with the subsequent flipped classroom approach, focusing on three aspects: the distinction between flipped and traditional classrooms, the emphases of flipped classroom instruction, and the perceived impact of the flipped classroom on learning efficiency. The findings are presented in **Table 1**.

The analysis of **Table 1** indicates that the flipped classroom approach is primarily student-driven (36.0%), with teachers serving in a supplementary capacity, while also significantly enhancing teacher-student interactive activities (57.7%). The flipped classroom effectively fosters a passion for learning among students (44.1%) and emphasizes a balanced approach to theoretical and prac-

tical development (37.8%). The adoption of the flipped classroom methodology for a semester has notably boosted students' efficiency in learning (72.1%). The flipped classroom has moved away from the traditional, teacher-centric mode of instruction (6.3%) and has combated the trend of lower learning efficiency (5.4%).

Table 1. University physical education students' perceptions of the flipped classroom (Supportive responses, percentage).

Contrasts within the Flipped Classroom	Prioritization in Flipped Classroom Instruction	Learning Efficiency
Teacher-Centric, 7 (6.3%)	Fostering a Passion for Learning, 49 (44.1%)	High, 80 (72.1%)
Student-Centric, 40 (36.0%)	Equilibrium between Theory and Practice, 42 (37.8%)	Medium, 25 (22.5%)
Teacher-Student Interaction, 64 (57.7%)	Establishment of Innovative Courses, 20 (18.0%)	Low, 6 (5.4%)

3.2. A Comparative Study on University Students' Assessments of the Flipped Classroom Outcomes

An in-depth differential analysis of the flipped classroom was performed based on the students' perspectives, with the detailed outcomes presented in **Table 2**.

Table 2. Analysis of variance in student attitudes towards the flipped classroom outcomes.

Student Perspective	Inclination Towards Flipped Classroom			Efficiency Enhancement by Flipped Classroom		
	Count (%)	χ^2	<i>P</i>	Count (%)	χ^2	<i>P</i>
In Favor	61 (88.4)			64 (80)		
Against	0	58.8	0	5 (6.3)	45.6	0
Neutral	8 (11.6)			11 (13.8)		

Student Perspective	Appropriateness of Expanding Flipped Classroom			Beneficial Influence of Flipped Classroom		
	Count (%)	χ^2	<i>P</i>	Count (%)	χ^2	<i>P</i>
In Favor	64 (74.4)			65 (73.9)		
Against	10 (11.6)	23.8	0.001	11 (12.5)	27.2	0
Neutral	12 (14.0)			12 (13.6)		

Analysis of **Table 2** reveals that there is a statistically significant difference in student attitudes towards all facets of the flipped classroom ($P < 0.001$), with a majority expressing support for the flipped classroom method (88.4%), acknowledging its capacity to enhance learning efficiency (80%), and viewing its impact positively (73.9%). A significant proportion also endorses its widespread adoption (74.4%).

3.3. Study on the Specific Modalities of the Flipped Classroom

The concept of the flipped classroom has been long-standing, with extensive re-

search contributions from scholars. The flipped classroom manifests in numerous forms, detailed in **Figure 1**. Based on this study's survey findings, the acceptance levels among students for the various flipped classroom models are ranked as follows: peer evaluation and lectures, independent study by students outside of class, followed by in-class lectures > parallel interactive sessions with multiple groups engaging in research discussions and presenting diverse perspectives > prioritizing practice over lecturing, with a student-centric approach > project-based inquiry that encourages teamwork through collaborative projects > teacher-facilitated student presentations, segmenting the class for organized study and student-led explanations > case-based reviews, employing case studies to facilitate knowledge application in student reports > student-led questioning, encouraging students to formulate and respond to questions.

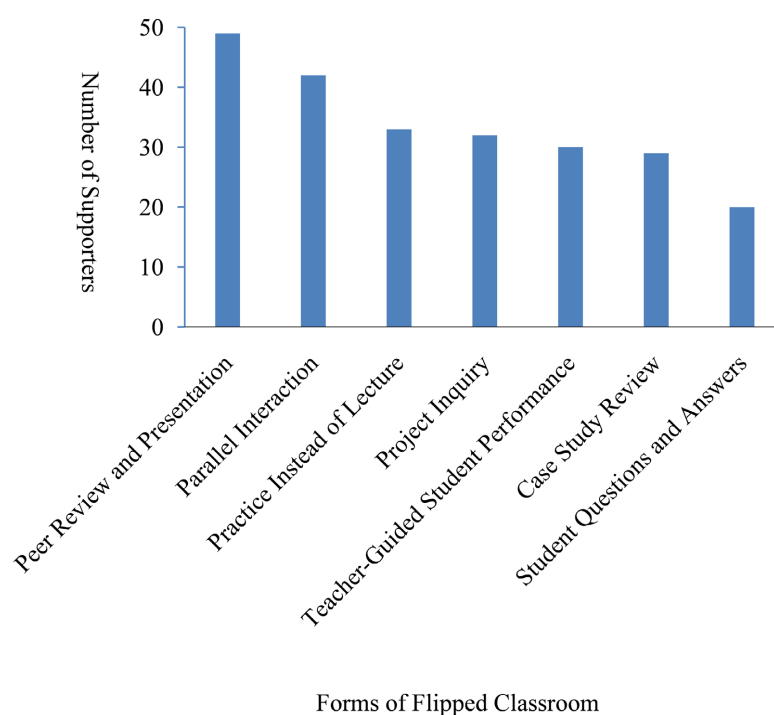
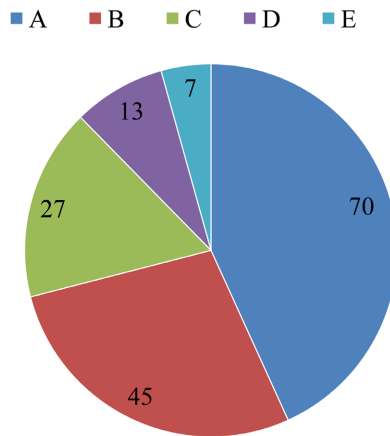


Figure 1. Satisfaction levels with different flipped classroom approaches.

3.4. Verifiable Study on the Impact of the Flipped Classroom

In comparison to traditional classroom instruction, the majority of students perceive that the flipped classroom enriches their learning experience beyond the acquisition of knowledge, such as enhancing public speaking skills, and ensures a more robust understanding of the material. Moreover, it appears to provide a targeted approach to addressing complex knowledge issues (**Figure 2**). Nonetheless, a subset of students suggests that the flipped classroom increases the complexity of assignments, potentially leading to course fatigue. An insignificant number of students see little to no distinction between the flipped classroom and traditional teaching methods.



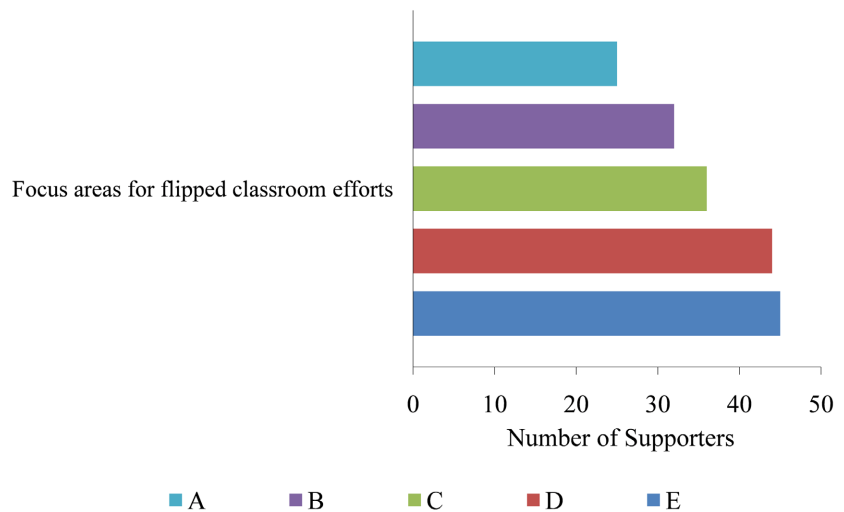
Number of people supporting the effectiveness of the flipped classroom

Note: A → Able to learn more than just knowledge; B → Conducive to a firmer grasp of knowledge; C → Able to solve knowledge problems more specifically; D → Homework becomes more complicated, leading to weariness towards the course; E → No significant difference.

Figure 2. Statistical analysis of the empirical outcomes of the flipped classroom.

3.5. Prospective Trends in the Evolution of the Flipped Classroom

Students have offered feedback and recommendations concerning the flipped classroom. A significant number suggest that it should not be confined to indoor settings alone, advocating for a more varied and engaging teaching process and for the curriculum to be more relevant to real-life experiences. Interestingly, the ability of teachers to express themselves linguistically does not seem to be a primary area of concern for students, with more details available in Figure 3.



Note: A → Teachers' language expression is vivid and engaging; B → Classroom atmosphere actively led by students; C → Knowledge content extends into daily life; D → Teaching process is diverse and interesting; E → Teaching environment is no longer confined to the classroom.

Figure 3. Prospective focus and initiatives for the flipped.

4. Discussion

This study's focus was on students from the School of Physical Education. Given their specialization in sports-related training, they generally exhibit less enthusiasm for theoretical coursework compared to their peers from other disciplines. The semester-long direct engagement with both traditional and flipped classroom models has led the students to a deepened comprehension of the contrasts between the two approaches. Liu Hui's integration of the MOOC flipped classroom into higher education yoga instruction revealed its efficacy in enhancing autonomous learning, learning outcomes, and student satisfaction and engagement with the course (Liu, 2023). The results of this study clearly highlight the flipped classroom's benefits, notably in fostering a learning zeal and improving efficiency. These findings align with those of Xiao et al. conducted a study on volleyball education under the student-centric OBE (Outcome-Based Education) philosophy (Xiao et al., 2023).

In contrast to the conventional didactic model, where teaching is primarily lecture-based with limited student interaction, leading to a somewhat stagnant classroom ambiance, the flipped classroom's implementation has positioned students at the helm of their educational journey, garnering more support for this teaching model. The data shows a pronounced stance among students, with a considerable majority, 88.4%, favoring the flipped classroom, indicating its successful application. Fusion of the flipped classroom with the instruction of traditional ethnic sports in universities illustrated students' improved grasp of the cultural significance and value inherent in these sports (Hu, 2023).

Diverse implementations of the flipped classroom exist, with academics in higher education pioneering and redefining classroom pedagogy (Yan & Huang, 2023; Fan, 2023b; Liu, 2023; Yuan & Wu, 2023; Mendoza López et al., 2023; Zhang, 2023; Shan et al., 2023; Zhao et al., 2023; Li et al., 2023). Li et al. enhanced medical interns' satisfaction through a comparative study with the O-PIRTAS flipped classroom model (Zhao et al., 2023). Zhang et al. delved into the progressive trajectories of the flipped classroom paradigm (Zhang & Li, 2023). Li et al. have evaluated the effectiveness of flipped classroom instruction underpinned by gamification learning principles (Li et al., 2018). This study indicates a student preference for interactive, peer-driven presentations. These results align with the work of Hu (Hu & Zhu, 2023), who endorse the efficacy of peer presentations with subsequent academic review and critique by classmates.

The flipped classroom approach not only imparts textual knowledge but also imparts broader wisdom. Students' presentations, extending beyond textbook content, include contemporary literature reviews and are enriched by personal experiences, thereby reinforcing the integration of theory and practice, leaving a lasting impression of the coursework on students. Tao emphasize the importance of clear teaching goals, resource preparation, and instructional design as crucial for enhancing educational quality (Tao, 2023). Ideological education is

woven throughout the curriculum, with teachers leveraging their life experiences to impart moral and life lessons, advocating for fitness, knowledge, and the pursuit of becoming valuable contributors to society. This approach also incorporates learning from the advanced ideological concepts utilized by other academics (Peng et al., 2023; Yang et al., 2023; Zhang et al., 2023). Wang & Chen have applied “Item Group Theory” to unearth the ideological-political dimensions of public sports education in universities (Wang & Chen, 2023). Zhang have focused on cultivating students’ ideological perspectives and health awareness in line with the aspiration of becoming a nation strong in sports (Zhang, 2024).

Students have expressed a clear preference for moving beyond the confines of the traditional indoor classroom, with a significant inclination towards outdoor activities and connecting with nature. The call for variety and engagement in teaching approaches is a priority for students. Tao Xinhua’s implementation of both indoor and outdoor teaching strategies has proved effective in sparking students’ learning interests (Tao, 2020). In the realm of education, student satisfaction serves as a benchmark for evaluating our performance, necessitating that educators persistently strive to innovate and reformulate classroom methodologies to fulfill students’ educational expectations.

5. Conclusion

The empirical investigation presented in this paper validates the flipped classroom’s impact within the context of theoretical courses in physical education. The findings attest to the widespread acceptance and endorsement of the flipped classroom by the majority of students, citing its contribution to enhancing teacher-student interaction, increasing student engagement, and boosting learning efficiency. The focus of flipped classrooms is on students as the core, and student participation is an important indicator of process evaluation, accounting for more than 50% of the total score for students. Teachers should analyze student needs, formulate personalized service objectives, optimize teaching content, flexibly use multiple teaching methods, and continuously improve their teaching ability in flipped classrooms. The setting for flipped classroom activities should expand beyond indoor spaces, with a push for innovative and stimulating teaching practices. Educators are encouraged to embrace flexible and creative thinking to evolve the concept of the flipped classroom, tailoring it to various academic levels and disciplines for optimal effectiveness.

Funding

The 2022 Annual Doctoral Research Initiative of Chizhou College (CZ2022YJRC03) and the Anhui Provincial Quality Project of Higher Education entitled “Study and Practical Reform of the ‘Four-Year Consistent System’ in College Physical Education Across General Universities in Anhui Province” with a case study focusing on Chizhou College (2021jyxm1013).

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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