

THE DEVELOPMENT OF FLIPPED CLASSROOM TEACHING MODEL TO IMPROVE SELF-STUDY ABILITY IN PHYSICAL EDUCATION OF UNDERGRADUATE STUDENTS


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Abstract

The purposes of this study were 1) to development of flipped classroom teaching model to improve self-study ability in physical education of undergraduate students. 2) to study the results flipped classroom teaching model to improve self-study ability in physical education of undergraduate students. The simple group of this study consisted of 30 third-year of class 3 undergraduate students with mixed abilities (strong, medium, and weak) were from physical education major of He Zhou University. The research instruments included 1) lesson plans and 2) self-study ability test. The assessment questions aim to assess three 3 dimensions: Observation and analysis ability; Self-organizing ability; Self-training ability. The data were analyzed by mean, standard deviation and t-test for dependent sample. The results revealed the followings: 1. The development of flipped classroom teaching model to improve self-study ability in physical education of undergraduate students which consisted of 1) principles 2) purposes 3) steps of teaching 4) assessment. The steps of teaching were classified as three steps; 1) Preparation before class 2) In class, and 3) After class. This model can improve self-study ability physical education of undergraduate students, achieving the research objectives. 2. The studying of flipped classroom teaching model to improve self-study ability in physical education results were conducted by comparing students' self-study ability before and after teaching with the flipped classroom teaching model, the average score of undergraduate students in pre-class assessments was 23.07 of full score 45, and in post-class assessments, it was 37.00. The post-class assessment scores were significantly higher than pre-class assessment scores at a statistical significance level of 0.01. This aligns with the research hypothesis.

Keywords: Flipped classroom teaching model, Self-study ability, Undergraduate students

Introduction

The General Office of the Communist Party of China Central Committee and the General Office of the State Council jointly issued the Opinions on Strengthening and Improving School Physical Education Work in the New Era and the Opinions on Strengthening and Improving School Aesthetic Education Work in the New Era. Both

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documents emphasize the importance of promoting coordinated development of cultural learning and physical exercise among adolescents, as well as helping them find enjoyment in sports activities. Universities are one of the main channels for implementing physical education, and their educational functions should be fully utilized. In the higher education stage, physical education courses should be closely integrated with the cultivation of innovative talents, aiming to cultivate high-quality talents with noble spiritual pursuits and noble personality cultivation. (China Central Committee, 2020)

In the research field of higher education curriculum education, many state-owned experts and scholars have achieved significant achievements. Therefore, it is particularly important to cultivate students' multifaceted abilities, especially their self-learning ability. During the 14th Five Year Plan period, with the rapid growth of the national economy, we are at a decisive moment for upgrading and transforming our industrial structure. Industrial restructuring and technological innovation will become the core driving forces for future economic and social development. The transformation and upgrading of industrial structure means that we need more talents with innovative capabilities and comprehensive technical skills. This requires universities to pay attention to the reform of talent training models to meet the needs of economic construction. As an indispensable part of China's vocational education system, higher education plays a significant role in talent cultivation.

In the specific field of physical education, we need to continuously promote educational reform, deeply grasp traditional values, have a deeper understanding of the professionalism of physical education, and be aware of its shortcomings; Thoroughly understand the definition of "whole" in theory and clearly define the interrelationship between "whole" and "part". In order to better integrate self-directed learning into school physical education teaching, we need to have a deep understanding of its overall concept and core concepts, and have conducted a concise discussion on this. (Yuan 2021)

The integration of physical education and physical education is a key strategy in promoting school physical education and promoting all-round growth of students in China. It has played a positive role in promoting innovative practices in higher education physical education teaching and the comprehensive development of students. In the context of the new era, the goal of talent cultivation has set stricter standards for higher education physical education curriculum. Therefore, in order to cultivate outstanding talents with comprehensive development in morality, intelligence, and physical fitness, and to achieve the strategic goal of "Healthy China", it is necessary to unify moral education with physical education in universities, build a new type of lecturers-student relationship, and improve the comprehensive quality and ability of students. (Zhang, 2023)

Self-study ability in physical education is to adapt to the continuous changes in school education. Therefore, lecturers should fully utilize modern information technology to stimulate students' learning motivation and make them the masters of learning activities. The most crucial step in determining educational goals is to enhance students' abilities in multiple aspects, especially enhancing their self-learning abilities, in order to lay a solid foundation for their future continuous and lifelong learning. In terms of teaching methods, thanks to the widespread application of network technology and multimedia technology, students can break free from the constraints of teaching content at any time and independently choose the content they want to learn. When evaluating teaching effectiveness, the improvement of students' independent learning ability is considered as a core element in evaluating school educational outcomes.

The implementation of the flipped classroom pre-learning model not only attaches great importance to the individual differences of each student, but also meets their personalized and diversified learning needs; in addition, this also solves to a large extent the problem of the problem of out-of-sync classroom teaching effects caused by large differences in basic knowledge. The implementation of flipped classroom can not only meet students' needs, skills and abilities and realize the principle of teaching students in accordance with their aptitude, but also promote students' personalized learning and strengthen the communication between students and lecturers ((Zhang, Meng, He and Hu, 2020).

The flipped classroom teaching method in college English and other courses and observed that students have been significantly improved in many aspects such as self-management, independent learning mentality and independent learning motivation, especially in solving problems. Performed better in terms of problems encountered during the learning process. By adopting a student-centered teaching concept and using a flipped classroom approach, students' independent learning and thinking abilities can be better cultivated, thereby effectively improving their academic performance. Luo (2023) pointed out that based on the flipped classroom teaching model, it was found that students' learning initiative is enhanced, and their ability to formulate study plans, manage study time, and utilize the learning environment is improved. Students' English independent learning ability has been improved. At the same time, it is emphasized that students' personalized learning and teamwork learning are not only the key ways for students to learn independently before class, but also the key factors to ensure students' independent learning results.

As the rationale shown above, the researcher realizes the importance of studying “The Development of Flipped Classroom Teaching Model to Improve Self-Study Ability in Physical Education of Undergraduate Students”. The flipped classroom teaching method provides students with abundant self-learning resources, while practical training teaching opens up new possibilities and platforms for students to practice theoretical knowledge. The use of flipped classroom teaching methods not only improves the learning effectiveness of physical education students in the classroom, but also facilitates effective teaching practices, which is of great importance in cultivating students' learning abilities.

Objectives

1. To development of flipped classroom teaching model to improve self-study ability in physical education of undergraduate students.
2. To study the results flipped classroom teaching model to improve self-study ability in physical education of undergraduate students.

Research Methodology

1. Population and Samples Population: There were 3 classes of 30 students each, totaling 90 third-year undergraduate students of physical education major of He Zhou University. The Sample Group: Through cluster random sampling, 30 third-year of class 3 undergraduate students with mixed abilities (strong, medium, and weak) were from physical education major of He Zhou University.

2. Conceptual Framework The conceptual framework of the study, the development of flipped classroom teaching model to improve self-study ability in physical education of undergraduate students, was as follows:

3. Research Instrument The development of flipped classroom teaching model to improve self-study ability in physical education of undergraduate students, the research Instruments were as follows:

3.1 Lesson plan according to the Flipped classroom model, Including three lesson plans, 18 hours of teaching time, follow the instructional steps of the flipped classroom teaching model respectively.

3.2 Self-study ability test. According to the purpose of this study, self-directed learning ability can be divided into three dimensions. 1) Observation and analysis ability; 2) Self organization ability; 3) Self training ability. The researcher designed his own test questions for these three sub-competencies and used them to test students' learning achievement after passing the expert assessment.

4. Collection of Data In this research, the data collection period was used for the first semester of the 2023 academic year from October 23, 2023 to November 3, 2023, total of 12 hours. Follow the steps as follows.

4.1 This research is experimental research. One Group Pretest – Posttest Design was used with the following experimental design:

4.2 Taking Self-study ability test to obtained from the analysis, the difficulty value, Discriminant power, and reliability value. Then it was tested before class with the 30 students that were not research samples, these results of the difficulty value was ranged from 0.565 to 0.681, Discriminant power was ranged from 0.560 to 0.664, and reliability value was 0.81, then Self-study ability test was improved.

4.3 Teaching according to lesson Plans that using Flipped classroom model to improve Self-study ability. Organized teaching by the researcher about 6 hours per week, total 18 hours.

4.4 After completing the teaching, lecturers conducted with using the same test of Self-study ability to students. The scores obtained from the test were recorded to compare the Self-study ability of students before and after learning.

4.5 Getting data obtained from teaching activities according to using Flipped classroom model to analyze the data according to statistical methods.

5. Data Analysis

5.1 Analyze of verified the validity of lesson plan based on Flipped classroom model and self-study ability testing used the index of consistency as a criterion for consideration standard (Index of item Objective congruence: IOC).

5.2 Quantitative data were analyzed through descriptive statistics; means ($\bar{X}$), and standard deviation (SD.).

5.3 Quantitative data were analyzed through inferential statistics; Then calculate the different score of self-study ability before and after using Flipped classroom model were analyzed through t – test for dependent sample.

Research results

The research of this study was to the development of flipped classroom teaching model to improve self-study ability in physical education of undergraduate students and compare students' self-study ability before and after the implementation Flipped classroom model. The data analysis results were as follows:

Table 2 Self-study ability score between before and after learning

Self-study ability	n	Full Scores	Pre-test		Post-test		D
			$\bar{X}$	SD.	$\bar{X}$	SD.	
1. Observation and analysis ability	30	15	7.23	2.85	11.97	1.97	4.73
2. Self-organizing ability	30	15	7.97	2.55	12.63	2.19	4.67
3. Self-training ability	30	15	7.80	3.56	12.43	1.94	4.63
total		45	23.07	7.94	37.00	5.28	13.93

As can be seen from Table 2, the changes of improving self-study ability in physical education that arrange from most to least as follows, the observation and analysis ability, self-organizing ability and self-training ability scores of undergraduates with flipped classroom teaching method are as follows: 1) The average score for observation and analysis ability before learning is 7.23 points, and the average score after learning is 11.97 points, with an average difference of 4.73 point. 2) The average score for Self-organizing ability before learning is 7.97 points, and the average score after learning is 12.63 points, with an average difference of 4.67 point. 3) The average score for Self-training ability before learning is 7.80 points, and the average score after learning is 12.43 points, with an average difference of 4.63 point. After stratified teaching, the scores of students' observation and analysis ability, self-

organizing ability, self-training ability are higher than those before learning. Therefore, the flipped classroom teaching model can improve the improve self-study ability in physical education of undergraduate students and achieve the research purpose.

Table 3 Comparison of self-study ability before and after class by implementing the Flipped classroom model

Self-study Ability		n	Full Point	$\bar{X}$	SD.	t	P
Total score	Pre-test	30	45	23.07	7.935	-14.909	.000
	Post-test	30	45	37.00	5.278		

**Statistically significant at level .01 ($p < .01$)

From Table 3, The average data before the experiment was 23.07 with a standard deviation of 7.935, and the average data after the experiment was 37.00 with a standard deviation of 5.278. The score after the test is 13.933 higher than the score before the test. The results showed that in this experiment, the lecturers adopted reasonable and effective teaching methods, cultivated student' self-study abilities, and achieved good teaching results. The t-test results indicate that the t-value is -14.909, significantly higher than the t-distribution (normal distribution), with a p-value of 0.000 (* $p < 0.01$). Obviously, self-study ability has a significant impact on the academic performance of the sample group of students before and after learning.

Discussion

Research on the development of flipped classroom teaching model to improve self-study ability in physical education of undergraduate students was conducted in the first semester of the 2023 academic year. It involved the study of academic performance cultivation for 30 students who are obtained by simple random sampling with mixed abilities (strong, medium, and weak) were from He Zhou University using the flipped classroom teaching model. This research can be discussed from two aspects:

1. The development of flipped classroom teaching model to improve self-study ability in physical education of undergraduate students, the researchers divided the lesson plan writing into three steps according to the flipped classroom teaching model: 1) Preparation before class; 2) In class; 3) After class. The assessment of self-study ability was tested through 3 dimensions: 1) Observation and analysis ability; 2) Self-organizing ability; 3) Self-training ability. Three experts analyzed and evaluated the quality of lesson plans in flipped classroom teaching mode, and the evaluation results were completed by these experts. It is necessary to adopt flipped classroom teaching mode to improve students' self-study ability. In the flipped classroom teaching model, students are the center of learning, and lecturers play the role of mentors and helpers. Through mutual support and cooperation, this teaching model helps students to better grasp knowledge, stimulate their interest in learning, and ultimately enhance the self-study ability of each student. This finding is consistent with Zhang's (2015) research on how flipped classrooms enhance student engagement. Her research found that the flipped classroom model can effectively help students better grasp knowledge, stimulate their interest in learning, let students control their own learning progress, and learn and interact in class, so as to truly show the core status of students in learning. Flipped classroom allows students to study independently before class, and they can choose to pause or accelerate the course process according to their needs, which truly meets the learning requirements of students at all levels. In classroom teaching, the role of students changes from simple listeners and receivers to active participants and speakers. Exploratory learning in the classroom not only strengthens the "deep dialogue" between lecturers and students, but also enhances the one-to-one guidance role of lecturers in classroom teaching, so that lecturers can focus more on the learning of a single student. Through the way of inquiry, students can grasp the meaning of the text more deeply, truly master the analysis skills of the text, and apply the acquired knowledge to the solution of practical problems. The change of roles in the classroom has greatly

stimulated students' enthusiasm for learning and sharing, thus making the classroom environment more vivid and teaching results more prominent. In addition, the research of Huang, Xu and Shen (2020) found that the use of flipped classroom can effectively improve students' independent learning ability in the course of "Cell and molecular biology experiment". The use of flipped classroom teaching method can significantly enhance students' independent learning ability, make their learning goals clearer, optimize their learning habits, and enhance their practical operation ability, thus improving the effect of experimental teaching and the comprehensive quality of students on the whole. Wu (2023) also observed similar research results when adopting the flipped classroom strategy to cultivate college students' independent English learning ability. He proposed the method of "learning before practicing, practicing before learning" to promote learners' language input and output process, so as to improve their learning effect. His research also corroborates the findings of this study. Zhu's idea is that by adopting a flipped teaching method, students learn first and then teach, which can stimulate their self-learning spirit; We are committed to integrating and enhancing learning resources to enhance and expand students' ability to learn independently; We need to change the role positioning of lecturers and students, strengthen the interaction between them, and provide students with self-learning strategies and methods; Create a real language environment to cultivate students' autonomous learning strategies. We have created a learning context support system to guide students to monitor and evaluate the various stages and results of independent learning, with the aim of providing new ideas and references for college English teaching reform. The experimental results show that this method significantly improves students' English learning performance, self-efficacy, self-regulation ability and critical thinking ability, so as to further promote the improvement of students' independent learning ability. The continuous development of the new curriculum reform, flipped classroom teaching method has shown a strong momentum of development both in theory and practice. In our country's education and teaching, the traditional teaching methods can no longer meet the needs of the current society for the cultivation of talents' quality. In order to better meet the needs of talent training in the new era, the teaching model of flipped classroom has been widely concerned and valued. It is of great significance to introduce the flipped classroom teaching mode in the physical education of colleges and universities in China, which is beneficial to stimulate students' interest in learning, cultivate independent learning ability and improve teaching effect.

2. The studying results of flipped classroom teaching model to improve self-study ability in physical education of undergraduate students. Comparing the academic performance of students before and after the implementation of flipped classroom teaching mode. Flipped classroom teaching is a new teaching model that breaks the traditional lecturers centered and passive learning situation of students, and combines knowledge transfer with ability cultivation. Research has found that adopting a flipped classroom teaching model can help improve the autonomous learning ability of college students. The average score of students before learning is 23.07 points, while the average score after learning is 37 points, with an average difference of 13.93 points between the two. The post class evaluation score is significantly higher than the pre class score, and this difference is statistically significant (0.01). Shang (2020) found in his study on the impact of flipped classroom on the autonomous learning ability and grades of high school students in physics that experimental class students showed significant improvements in learning motivation, self-efficacy, learning time, and learning motivation, indicating that the implementation of flipped classroom significantly improved the autonomous learning ability of experimental class students in physics, further confirming our hypothesis. In addition, this finding is consistent with Huang's (2023) research on the application of PBL whole case teaching combined with flipped classroom in clinical teaching. Compared with the traditional teaching mode group, using flipped classroom teaching method can significantly improve students' self-learning ability. The flipped classroom teaching model breaks the limitations of traditional classroom teaching in terms of time and space. By fully utilizing classroom time to deepen the understanding of practical application of knowledge, lecturers have a deeper understanding of students. Overall, the

research results indicate that the use of flipped classroom teaching method can effectively improve the autonomous learning ability of college students, thereby achieving the research objectives.

Suggestion

1. Implications goal is enhancing students' self-study ability in physical education, lecturers should stimulate their interest in physical education, and encourage them to have in-depth exchanges and sharing in their interactions with lecturers. During the learning journey, lecturers should enhance students need to think more deeply, and communicate.

2. Using this model, lecturers should use variety of materials, resources and adapt a variety of learning strategies for taking students to have a deeper understanding and mastery of knowledge, so as to enhance their learning effectiveness and learning outcomes.

3. The guidance of lecturers can commit to further stimulating and enhancing students' problem-solving skills. Through high-quality online learning of flipped classroom model aim to cultivate students' self-study ability in physical education. Lecturers should use innovative thinking resources and required resources, organize a variety of engaging improve student learning activities, and ensure that students are able to review their assignments in a timely manner and check the completion of tasks by themselves.

4. In order to promote the continuous progress of teaching and improve the quality of teaching, higher education institutions should further deepen the research and development platform of online teaching to meet the diverse needs of lecturers and students, and ensure that they can make more effective use of abundant resources to improve their learning results. In addition, the training of lecturers in the theoretical knowledge and practical skills of teaching should be strengthened, and the application of blended learning techniques should be deeply explored to ensure the high quality of teaching methods.

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