

# Research on Exercise Physiology Course Based on SPOC Mixed Teaching Mode

Xiufeng Zhao<sup>1,a</sup>, Ming Li<sup>1,b</sup>, Tao Sun<sup>2,c,\*</sup>

<sup>1</sup>College of physical education, Taishan University, Tai'an, China

<sup>2</sup>Dean's Office, Taishan University, Tai'an, China

<sup>a</sup>zhaoxf2003@126.com, <sup>b</sup>limingcanoe@163.com, <sup>c</sup>suntao.1979@163.com

\*Corresponding author

**Abstract:** To carry out Hybrid Teaching of Exercise Physiology based on SPOC platform, we should always adhere to the teaching design concept of "taking students as the main body, teachers as the guide, goals as the main line and problems as the primary key", build five types of online resources based on the principles of comprehensiveness, openness and interaction, and design the hybrid teaching process in the order of pre class guidance, in class research and after class extension, To evaluate the teaching effect, we should adopt the method of multiple and integrated assessment, and overcome five adverse factors affecting mixed teaching. Practice shows that the hybrid teaching of online learning and classroom face-to-face teaching can effectively promote and cultivate students' awareness and ability of autonomous learning, and reasonable online learning is beneficial to improve the quality of Exercise Physiology teaching. Research teaching mode is a new way to cultivate creative talents. In order to improve the teaching quality of Exercise physiology course in Physical Education Colleges of colleges and universities, the purpose of this study is to explore the application of research teaching in Exercise Physiology teaching, preliminarily construct the research teaching mode of Exercise Physiology, and apply it in the teaching of Exercise Physiology in the future.

**Keywords:** SPOC Mixed Teaching Mode; Exercise Physiology; Teaching Design Concept

## 1. Introduction

Exercise Physiology is a compulsory professional basic theory course and main course for physical education students. It plays an important role in all directions of students in sports colleges and universities. It is the main assessment course for students' postgraduate entrance examination and doctoral entrance examination [1]. This course mainly expounds the law of normal physiological activities of human body and the change law of various physiological activities of human body during various sports activities [2]. Reveal the impact of sports training on the human body and the adaptive changes and laws of the human body to sports training, so that students can master the change laws of human normal physiological functions and the impact of sports training on various physiological functions of the human body, and then use it to guide sports training practice, so as to lay a necessary physiological foundation for learning other follow-up courses and guiding sports training after graduation [3]. However, because the teaching content has strong knowledge, interdisciplinary and abstract, the teaching is boring [4]. With the rapid development of network information technology, network information technology is constantly applied to teaching. MOOC platform is produced. MOOC platform can share high-quality teaching resources and promote the reform and development of school curriculum [5]. However, MOOC teaching can not fully adapt to school classroom teaching. Teachers and students lack face-to-face communication and communication, lack of teachers' management and monitoring of students' learning process, low learning enthusiasm, learning efficiency and effect are not ideal, which affects the quality of Education [6]. Hybrid teaching, that is, the combination of traditional teaching methods and online learning [7].

Hybrid teaching mode has significant advantages in enhancing students' initiative in participating in the teaching process and improving the effect of curriculum learning. Hybrid teaching can be carried out in SPOC environment [8]. However, there is still a lack of systematic research at home and abroad on when and how to combine the two [9]. How to use students' fragmented time more in active and meaningful learning through reasonable design, and the teaching hours of sports physiology are greatly reduced. Due to the large teaching content and strong theoretical nature of the course, students

generally reflect that learning is difficult and the teaching effect is not ideal [10]. In order to improve the learning efficiency of this course and realize the goal of cultivating innovative talents in Colleges and universities. Under the guidance of advanced teaching design concept, based on the construction of rich and diverse online teaching resources and the key to building an all-round and all-time interactive communication platform, actively promote the online and offline hybrid teaching mode. After two years of exploration and practice, the author believes that online teaching based on SPOC platform can effectively integrate and make full use of teaching resources, It can effectively promote students' knowledge internalization and knowledge construction, improve teaching efficiency, and then improve the quality of talent training.

## **2. Introduction of Exercise Physiology Course**

### ***2.1. Teaching Reform of Exercise Physiology***

Exercise physiology is a main theoretical course in the field of sports and a basic subject in the field of sports. As a professional basic course, Exercise physiology not only lays the foundation for learning sports psychology and sports training, but also provides a certain theoretical basis for sports training and physical exercise. In teaching, we will focus on the chapters of muscle, blood, circulation, respiration, material and energy metabolism, neuroendocrine regulation, the formation of sports skills, the physiological characteristics of physical quality, the change law of human functional state during sports, the evaluation of sports effect, the physiological characteristics of human, especially the blood supply to the heart, maximum oxygen uptake, etc. The contents of kidney function and endocrine function can relatively reduce the teaching time. Special environment and sports ability, female physiological characteristics and sports, physiological characteristics of the elderly and sports are self-taught by students. In the teaching process, students are the main body of learning. Teachers should pay attention to mobilize students' learning initiative, guide them to think independently, improve their ability to analyze problems and improve classroom efficiency. Select some less difficult and non-key chapters for students to learn by themselves, such as chapters on special environment and sports ability. Teachers first put forward several key questions, let students learn with questions, and check students' self-study effect through the answers to questions in class. Teachers should encourage students to surf the Internet or browse some better journals and magazines in the library. Through this form of learning, students' enthusiasm for active learning can be improved, the purpose of consolidating knowledge can be achieved, and passive learning can be changed into autonomous learning and research-based learning. Adopt the problem-centered teaching method to stimulate students' independent thinking. It can not only improve the ability to analyze problems, but also leave a deep impression on students, and the teaching effect is good. Actively carry out debate teaching and cultivate students' self-study ability. Divide students into groups and guide students to consult materials, classroom statements and discuss some problems in practice or the discipline through Q & A and discussion, so as to inspire students' thinking, activate the classroom atmosphere and promote students to better master the basic knowledge and theory of the course. Use wall charts, multimedia projection, video and other audio-visual equipment to show students vivid and intuitive scenes, visualize the abstract content and improve the teaching effect. By guiding students to solve sports cases according to general theories, students not only acquire knowledge, but also learn the method of analyzing problems.

### ***2.2. Concept and Characteristics of Research-Based Teaching***

Compared with the teaching mode based on one-way knowledge transfer, the research teaching mode is a teaching system integrating learning and research. It is a new teaching mode to accumulate knowledge, cultivate ability and train thinking in discussion. The theoretical basis of the research teaching model is the "discovery learning model" of Bruner in the United States and the "cognitive development theory" of Piaget in Switzerland. The basic view of these theories is that educators should establish an appropriate system and adopt an appropriate model to encourage, guide and help students to actively find, analyze and solve problems, and acquire knowledge, train skills, cultivate ability and develop personality in such a "inquiry" process. The research-based teaching mode takes students and their inquiry learning as the main body and aims to cultivate and improve their research and innovation ability. It well reflects the educational guidance ideas of guidance and autonomy, regulation and openness, unity and diversity, organic combination of theory and practice and dialectical unity. Compared with the traditional teaching mode, research teaching is a "problem" centered teaching. The role of teachers has changed greatly and plays a guiding role in the development of teaching activities,

while students are the main participants in teaching activities and play a subjective role. Traditional teaching focuses on Teachers' imparting knowledge, while research teaching emphasizes students' inquiry and autonomous learning to cultivate their ability to analyze and solve problems. Teaching attaches importance to the results of teaching, while research teaching focuses more on the process. Traditional teaching emphasizes the whole teaching process in the classroom, while research teaching emphasizes openness, but the combination of classroom and extracurricular.

### 3. Introduction of SPOC Teaching Mode

#### 3.1. SPOC Mixed Teaching Mode

SPOC platform has the functions of teaching resource management, teaching process management, teaching content management and learning process evaluation. It provides a convenient way for the push of teaching resources and learning tasks, the communication and interaction between teachers and students, and between students and students. However, due to the particularity of Exercise Physiology curriculum, it also needs face-to-face teaching and guidance in class. In continuous practice, the classroom face-to-face teaching of Exercise Physiology is organically combined with SPOC online learning. Relying on online course resources, guided by teaching guidance plan and in the main form of cooperative inquiry learning, online and offline hybrid teaching is carried out on SPOC platform and real classroom. Teachers are the cognitive subject of learning, and the learning process is through active exploration The process of discovering problems and meaning construction. The construction of online resources is the basis for the implementation of hybrid teaching. As shown in Figure 1, it is the block diagram of hybrid teaching mode based on SPOC:

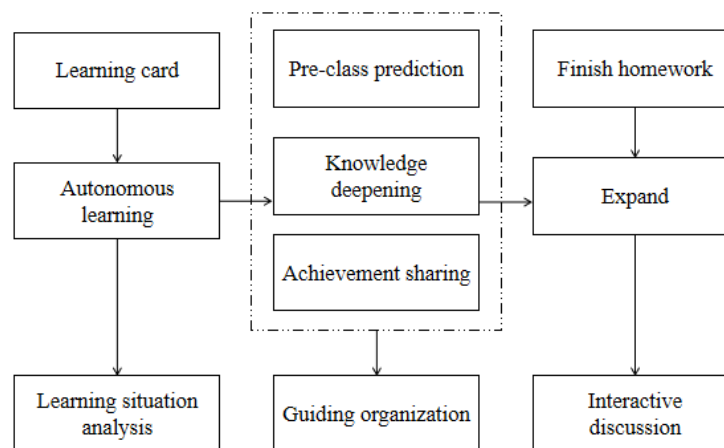


Figure 1: Block diagram of hybrid teaching mode based on SPOC

In the process of resource construction, we should always adhere to the construction principles of comprehensiveness, openness and interaction. Comprehensiveness means that online resources should cover all knowledge points of Exercise Physiology, be presented in a way conducive to students' learning, and reflect the whole process of teaching. Openness means that the construction of online resources is not an overnight thing, nor the end of the course, instead, we should continue to build, fully mobilize the subjective initiative of teachers and students, and jointly build online resources. Therefore, online teaching should always focus on students as the learning subject, under the conscious guidance of teachers, and around the main line of curriculum teaching objectives, provide rich and diverse learning resources, convenient and fast retrieval methods and timely and effective communication and interaction, Take the problem as the traction to reconstruct the teaching content, optimize the teaching design, cultivate the students' learning interest, improve the learning ability, and truly teach students according to their aptitude.

#### 3.2. Integration of SPOC and Curriculum

SPOC based teaching can move the key points and difficulties of teaching forward and make time for classroom teaching to carry out hands-on practice, that is, students can watch the teaching video by themselves through the mobile terminal before class to master the key points and difficulties of

teaching. In class, teachers lead to cultivate students' practical ability through group cooperation, discussion, practice, homework and Q & A. The construction of teaching mode in SPOC environment, on the one hand, makes full use of the small and open characteristics of SPOC to push the key and difficult points of the course to the mobile terminal, so that students can break the space-time limit and use fragment time for learning with the help of the mobile terminal; On the other hand, the flipped classroom form of SPOC avoids students' passive learning. The design of learning activities pays attention to students' personalized learning and collaborative learning, which is conducive to building an open, flexible and efficient learning environment and improving students' participation in curriculum learning. The mixed teaching model based on SPOC environment does not copy the classroom move, but pays attention to the organic combination of e-learning environment and classroom teaching environment, constructs a new model of mobile learning combined with traditional classroom teaching, enhances students' initiative to participate in the teaching process and improves the teaching effect from the aspects of teaching behavior and teaching design, As shown in Figure 2, it is a hybrid teaching process based on SPOC platform:

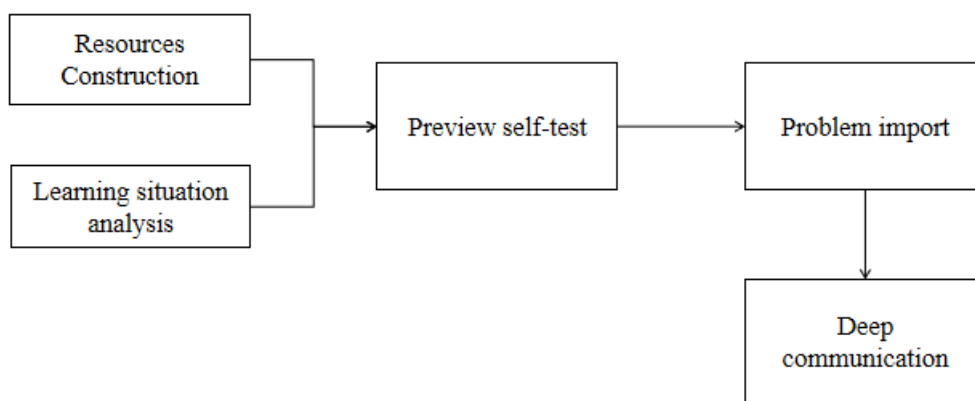


Figure 2: Hybrid teaching process based on SPOC platform

In the long-term traditional teaching process, we often only pay attention to the learning of theoretical knowledge and ignore the cultivation of students' comprehensive practical ability. Moreover, due to the limitation of class hours, the role of school physical education in the cultivation of students' comprehensive ability will be weakened. Therefore, adopting the mixed teaching mode in the teaching of school physical education is an effective way to comply with the curriculum reform and development and improve the teaching effect and students' comprehensive quality.

#### 4. Construction of Mixed Teaching Mode of Exercise Physiology curriculum based on SPOC

Combined with the curriculum standard of Exercise Physiology, systematically sort out the curriculum objectives and contents of each chapter, use pan Ya superstar as the main network teaching platform, and use the mixed teaching model in the teaching of Exercise Physiology in combination with high-quality teaching resources such as classroom and Chinese college students' MOOC class network. Online learning activities are mainly students' autonomous learning of courses using SPOC platform. The design and development of SPOC teaching platform is a key factor for the success of hybrid teaching. The content of practice is mainly that students apply theory to practice through theoretical study, observation and analysis of high-quality PE class videos. By comparing the results of students in different grades of the same major, the results of students in the mixed teaching mode have been significantly improved, and the effect is better in the improvement of their professional skills and the cultivation of practical ability. After class, continue to check and make up for deficiencies, publish homework and test questions on the teaching platform, and students use the form of group discussion for inquiry learning, respect students' ideas and truly reflect students' subjectivity.

#### 5. Conclusion

The mixed teaching mode of Exercise Physiology based on SPOC can not only meet the needs of students' personalized learning and truly realize "student-centered learning", but also stimulate teachers' research on teaching, and teachers can focus on the design of teaching process and the evaluation of

students' process. In addition, the mixed teaching mode puts forward higher requirements for teachers. Teachers need to carry out teaching activities around students, platforms and teaching resources. Therefore, it is necessary to constantly enrich teaching resources and improve the teaching platform. Scientific process evaluation indicators are the guarantee for the effective implementation of teaching. In the teaching reform of Exercise Physiology, research teaching should be the main goal, which not only meets the requirements of the curriculum reform, but also meets the needs of cultivating innovative talents in the new century. In the teaching of Exercise Physiology, according to the teaching content, the content of human physiology can be combined with physiological experiment, and the part of exercise physiology can be combined with exercise practice for research teaching. Make the teaching quality of Exercise Physiology to a new level, and make contributions to the training of qualified sports professionals.

### Acknowledgments

Supported by Special Project of Teacher Education Research of Taishan University in 2021; Project number: JY-01-202111.

### References

- [1] Chen Changjiang, Zhang Fengying Teaching reform practice of sports physiology based on SPOC and learning pass China educational technology equipment, 2021 (1): 4
- [2] Chen Rui Practice and Reflection on the course of financial management based on SPOC mixed teaching mode Shandong textile economy, 2021 (9): 4
- [3] Guo Xiaoyun Exploration of mixed teaching based on SPOC -- Taking English teaching method as an example Shanhaijing: Frontier of education, 2020 (12): 2
- [4] Yu Yang, Li Yao, Li Weihong, et al Research on the application of mixed teaching in physiology course China continuing medical education, 2019, 11 (35): 4
- [5] Han Chunmei, Li Chunlong Promotion and application of SPOC mixed teaching mode in the course of plant and plant physiology Rural science experiment, 2017 (9): 1
- [6] Jiang Wenyin, Yang fenhong Design and application of "SPOC + Classroom" hybrid teaching based on Erya platform Computer education, 2017 (12): 5
- [7] Liu Lindong, Wu Yilin, Huanghai Construction and practice of mixed teaching model based on SPOC Modern computer, 2019 (25): 4
- [8] Cui Li Research on school physical education curriculum based on SPOC mixed teaching model Contemporary sports science and technology, 2020, 10 (17): 2
- [9] Qian Yan, Wang Rui, Wei Wei, et al Application of hybrid teaching mode based on SPOC + live broadcast in physiology teaching Health vocational education, 2021, 39 (11): 3
- [10] Ru Hailong, Chen Weiya Exploration on the mixed teaching mode of health education course based on SPOC China continuing medical education, 2018, 10 (25): 4