

Optimization and Integration of Human Movement Science Courses for Applied Undergraduate Physical Education Majors

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Abstract: Human movement science is a course that trains students to master the basic theories, basic knowledge and basic skills of physical education, and gives students a strong practical ability and natural science and humanities literacy. However, at present, the content system of teaching materials under human movement science course is huge, and some independent courses have many contents. The contradiction between too many courses and less class time is becoming increasingly prominent. Therefore, the optimization and integration of human movement science curriculum for applied undergraduate physical education majors is proposed. Through the compression of the content system of the experimental teaching materials of each course, the improvement of some independent experimental contents, the appropriate increase of experimental teaching time, the adjustment or deletion of some repeated experimental teaching content, and the creation of independent experimental courses, the optimization and integration of human movement science curriculum for applied undergraduate physical education majors is completed.

Keywords: Physical education; Education major; Human movement science course; Optimization and integration

1. Introduction

Human movement science is one of the important secondary disciplines under the first-level discipline of sports science in sports colleges and universities in China. The four courses of sports anatomy, exercise physiology, sports health, and sports biochemistry are the main ten courses in the new curriculum plan announced by the Ministry of Education in 2004. Moreover, experimental teaching is an important part of the curriculum. Through experimental teaching, it can not only verify and explore the theoretical knowledge of books, but also improve students' observation, hands-on ability and creative thinking, problem analysis, problem solving and scientific research ability [1]. It is the main way to achieve quality education and innovative education. Through human movement science, students can develop their professional skills in an all-round way. After graduation, they can be qualified for primary and secondary school sports and health education, extracurricular sports activities, after-school sports training and competition. They can also engage in school sports science research, primary and secondary school sports management, social sports guidance and other work, so that students become "multi-energy and special" application-oriented talents [2].

2. Compress the Content System of Experimental Teaching Materials for Each Course

At present, the results of the experimental textbooks supported by the latest edition of the main textbooks show that there are 41 sports physiology experiments, 36 sports biochemistry experiments, and 64 sports health experiments. Even experimental courses in the fields of sports physiology, sports biochemistry, and sports health are not possible, not to mention the general curriculum of physical education and social sports [3]. Exercise physiology, sports biochemistry, and sports health experiments were each composed of verification experiments, comprehensive experiments, and design experiments, as shown in Figure 1.

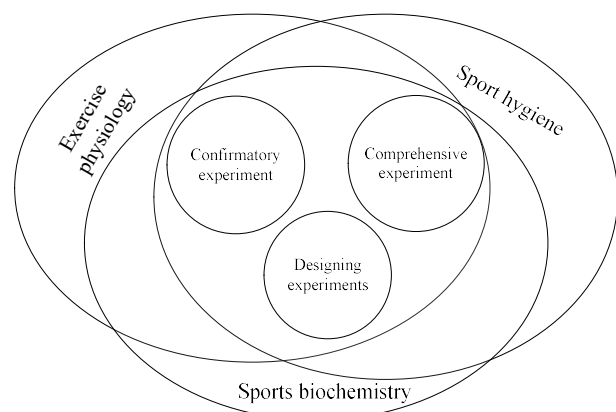


Figure 1. Experimental composition of exercise physiology, sports biochemistry and sports health

The 41 experiments of exercise physiology include 14 experiments. The experimental contents are shown in Figure 2. There are 18 comprehensive experiments and 9 design experiments, covering almost all the basic functions and motor functions of the human body. Calculated in 2 hours per experiment, it takes 82 hours [4]. The exercise physiology consists of verification experiments, comprehensive experiments, and design experiments. The specific test contents of the verification experiments

are shown in Figure 1. The 36 experimental contents of sports biochemistry, only 16 comprehensive and design experiments, only 32 hours to complete, and the total time of sports biochemistry is about 36 hours. The experimental content system of sports health education is even larger, with as many as 64 items, and involves more medical content, which is also more difficult. It is basically impossible to complete the current laboratory status and teaching level [5].

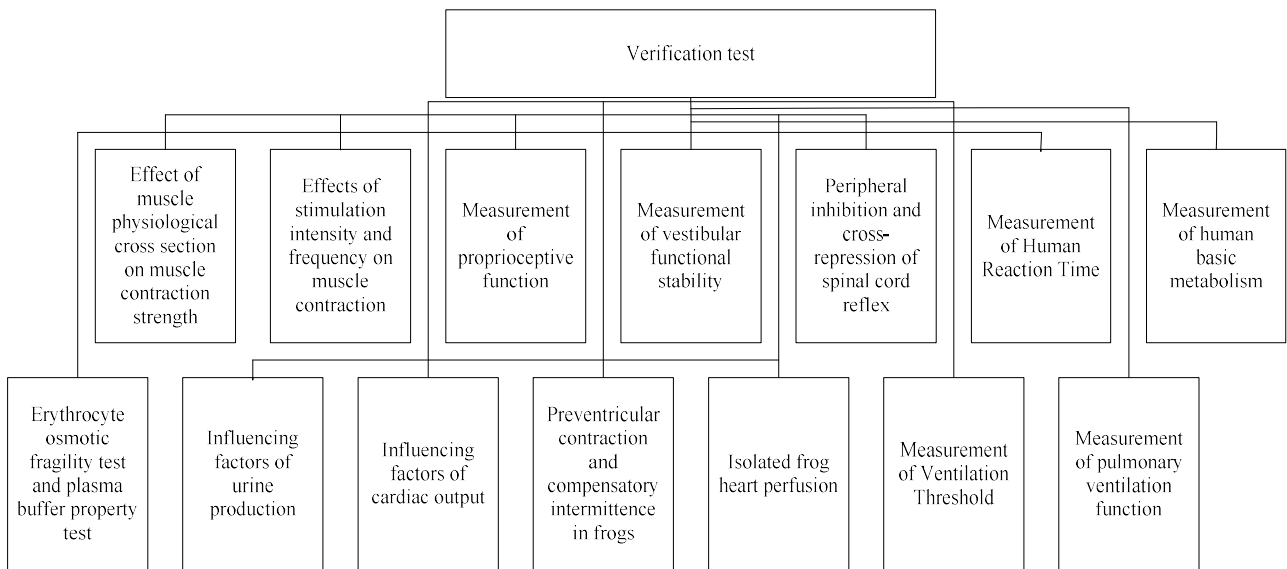


Figure 2. Composition of exercise physiology verification experiment

According to the modular spirit of the current curriculum and the requirements of each syllabus, the emphasis on sports physiology courses focuses on understanding the functional changes in the body's movements. Sports biochemistry focuses on explaining the causes of functional

changes, and sports health science focuses on the prevention of sports injury prevention and health promotion measures. The verification experiment of Figure 2 is now compressed as shown in Figure 3.

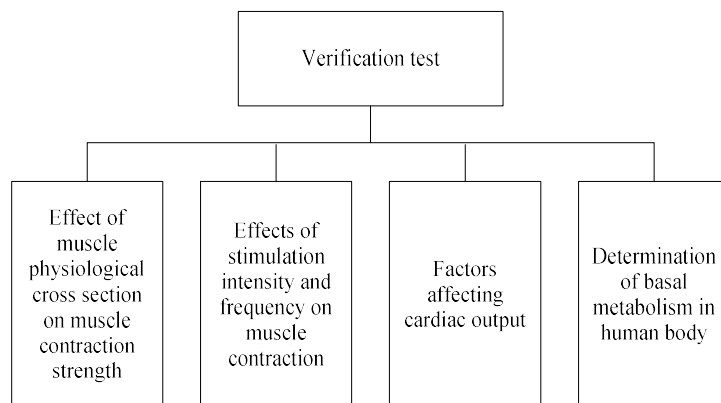


Figure 3. Composition and diagram of exercise physiology verification after optimization and integration

In addition, there are only 15 experiments in exercise physiology, 12 experiments in sports biochemistry, and 12 experiments in sports health.

3. Improve Some Independent Experimental Content

In the general teaching practice, each experimental class is arranged within 2 hours, but some of the experiments appearing in the experimental textbook far exceed the general teaching practice. Taking the exercise physiology course as an example, in the comprehensive experiment of "the influence of active rest on the working ability of the human body", the human working ability is difficult to evaluate accurately in the school hours [6]. "Design experiments such as measurement of exercise load and energy metabolism, study of the effects of exercise on the function of oxygen transport systems, comparison of aerobic exercise capacity of different populations, changes in physiological functions during exercise, physiological evaluation of training effects, characteristics of exercise fatigue, diagnosis and elimination, effects of hypoxic environment on oxygen transport systems and exercise capacity", are basically in the category of chronic experiments, ranging from a few dozen days to a few months before they can produce substantial results and meanings [7]. In the sports biochemistry course, "a biochemical monitoring and evaluation of the measurement class, a biochemical monitoring and evaluation of the exercise load, a biochemical monitoring and evaluation of the body function of a training cycle", especially in the last experiment, a training cycle is at least a few months. In the sports health course, these experiments are difficult to complete in the same short time, such as "determination of caloric needs of the human body, exercise prescription, exercise prescription for patients with coronary

heart disease, exercise prescription for diabetic patients, exercise prescription for hypertensive patients, exercise prescription for obese people, and exercise-fatigue-cardiopulmonary function indicators to judge fatigue." Therefore, the independent experiment with too large content has a certain negative impact on the subsequent experimental teaching [8], the original experimental completion rate is shown in Figure 4.

The content of some independent experiments is perfected. In general teaching practice, the schedule of each experimental class is generally less than 2 hours, and it is necessary to perfect the part of the independent experimental content in the experimental textbook. Taking the exercise physiology course as an example, delete the "physical evaluation of the effect of active rest on the working ability of the human body, the physiological evaluation of the training effect [9], the characteristics of sports fatigue, diagnosis and elimination, effect of hypoxic environment on oxygen transport system and exercise capacity" and other design experiments. "Biochemical monitoring and assessment of bodily functions in a training cycle" in the Sports Biochemistry course. In the sports health course, "Determination of caloric needs of the human body, exercise prescription, exercise prescription for patients with coronary heart disease, exercise prescription for diabetic patients, exercise prescription for hypertensive patients, exercise prescription for obese people, and exercise-fatigue-cardiopulmonary function indicators to judge fatigue [10].

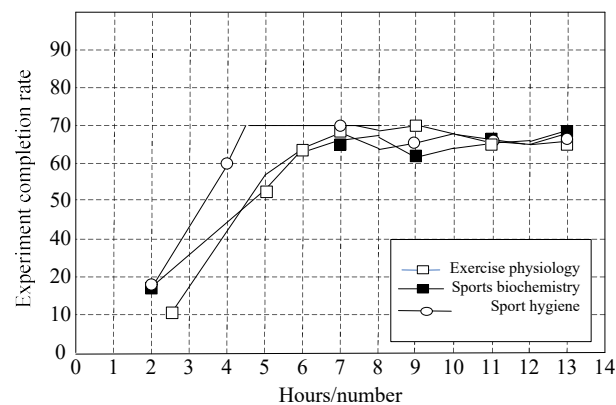


Figure 4. Test completion rate

4. Appropriately Increase the Experimental Teaching Time, Adjust or Delete Some of the Repeated Experimental Teaching Content, and Create an Independent Experimental Course

According to the latest syllabus requirements, the total duration of exercise physiology is 72, of which the exper-

iment can be reduced to 24 hours. The total class of sports health education is 54. The experimental class hours can be as little as 18 hours. The total length of sports biochemistry is 36, and the experimental class time is less than 12 hours.

Because the sports human science courses are self-contained and open separately, the experimental content is severely intersected [11]. Therefore, the following duplicates should be adjusted or deleted: measurement of

proprioceptive function, measurement of vestibular function stability, measurement of human body reaction, measurement of human basal metabolism, body composition measurement and evaluation, heart rate measurement and evaluation during exercise, aerobic exercise prescription, maximum oxygen uptake, anaerobic power evaluation, characteristics of exercise fatigue, diagnosis and elimination. The adjusted experimental setup not only eases the stress of class hours, but also saves experimental resources and improves the experimental teaching effect [12].

The experimental teaching of changing the human body science is based on the theoretical teaching of various disciplines to set the current content of experimental

teaching content, and create an experimental course of independent sports human science. Experimental and sports biochemistry, which focuses on the evaluation of exercise physiology, is based on the microscopic molecular level interpretation principle experiment and the practice and application of sports health care to form an independent experimental course with progressive and logical rigor [13]. It can not only avoid content duplication, system deviation, and name ambiguity, but also enable students to systematically master the knowledge structure and practical application of sports human science. The experimental completion rate after optimized integration is shown in Figure 5.

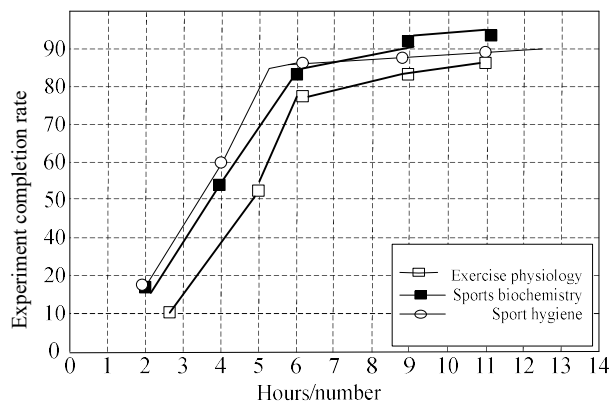


Figure 5. Test completion rate after optimized integration

5. Curriculum Optimization and Integration

First, strengthen the foundation, highlight the teaching of basic theoretical knowledge, and establish a solid foundation of knowledge and expertise. Physical quality training and assessment are strengthened to lay a solid foundation for better learning of special technology [14].

Secondly, to broaden the professional calibre, in the professional courses offered, the scope of professional development and the proportion of any elective courses have been increased, and the content of relevant majors has been further broadened to better meet the needs of basic education and social sports.

Thirdly, in order to make the content of the curriculum system more complete, continuous, and highlight the key points, importance should be attached to the cultivation of professional practice ability. According to the professional characteristics, the proportion of practical classes is increased, and the training of students' practical ability is emphasized, and professional skills training and level testing are institutionalized.

Then, the cultivation of comprehensive quality is strengthened. In order to strengthen the cultivation of students'

comprehensive quality, some new courses related to sports were set up [15].

Finally, it is necessary to encourage and help students to develop their specialties, determine their development direction according to their actual ability, do a good job in the professional or other professional work, participate in the national civil service examination, and participate in the "postgraduate entrance exams" diversion and preparation.

6. Conclusions

Through the compression of the content system of the experimental teaching materials of each course, the improvement of some independent experimental contents, the appropriate increase of experimental teaching time, the adjustment or deletion of some repeated experimental teaching content, and the creation of independent experimental courses, the optimization and integration of the sports human science curriculum for applied undergraduate physical education majors is completed. Human movement science is optimized and integrated to better cultivate talents with the theory and experimental research capabilities of sports human body science, and to train high-level professionals who can teach, research,

competitive sports and rehabilitation in sports and human sciences in secondary schools, sports research institutions, sports training bases, and health rehabilitation departments.

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