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Research-oriented Teaching Pattern of the Exercise Physiology Course Based on the Internet

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Abstract: Exercise physiology course is one of the backbone courses of the sports major in the colleges and universities of China. Due to the contents are various and theoretical for the students, so it is difficulty for those students to learn well. Also, there present a significant conflict between reduce of the teaching hours and adjustment of the teaching plan. To solve those problems and improvement the teaching effects, it is proposed the feasibility that the teaching pattern of research-oriented teaching on the exercise physiology course based on the internet environment. Also, it is put forward the construction scheme and the teaching evaluation system for the curriculum of exercise physiology under the condition of the internet environment. At last, some suggests and advices are put forward to improve exercise physiology teaching effects based on the internet.

Key words: Internet environment, exercise physiology, research-oriented teaching, evaluation system

INTRODUCTION

Exercise physiology is a branch discipline of the human physiology, the research object of this discipline is on the physiological and functional alterations of human body in one training or exercise activity (acute training) or long-term repeating exercise activity (chronic training) Wang and Hua (2007). This discipline is an important professional basic theoretical course for the majors of physical education and social sports. With the changes of contemporary sports values from overheating medal competition competitive sports to promoting the public health of the national fitness, from the service productivity to focusing on common person's life, the curriculum of exercise physiology has also changed from simple basic theoretical discipline to the practical course (Tu, 2009). However, it has to face the current situation of the course with multiple contents which are related with the basic knowledge of human physiology, human anatomy, biochemistry and athletic training and other multi-disciplinary knowledge, the teaching contents are very abundant, theoretical and complicated. The traditional teaching pattern which is teacher-centered, does not accommodate with the features of this course. In the teacher-centered teaching mode, the teaching effect is not very well and the students become very difficulty to read and learn the teaching materials. At the same time,

the teaching time is greatly reduced with the adjustment of the teaching plan of this course. Hence, there present a prominent contradiction between the multiple teaching contents and the reduced teaching time. Also, colleges or universities are quite limited to equip the teaching devices for those theory courses in sports major. All of these factors are made to lower the teaching effects of this course.

In the present stage, the teaching pattern for exercise physiology course in colleges and universities is still in the stage of exploration and improve. The traditional teaching pattern and means are emphasized to teach knowledge according to the books or teaching materials in the classroom and the teachers or professors exert as the center role. The traditional classroom teachers impart knowledge to all students and all students are passive, the dominate position of students is flooded. This education pattern makes students only accept what the teacher teaches and answer what the teacher asks. As a result, students are always passive learning. Hence, the traditional teaching pattern ignores to cultivate of student's independent learning, exploring and thinking ability. Moreover, the students would be lack of critical thought, imagination and innovation ability as long as they face some practical problems. Inquiry teaching which is student-centered, the goal of this teaching pattern is to make students learn in the means of scientific inquiry

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(Jiang and Luo, 2011). It requires teachers to create a teaching environment which is similar to scientific research or scientific explorative process. The goal of this process is to train their scientific attitude and scientific spirit, to improve students' thinking ability and innovation ability (Ma, 2010). Teachers should provide environments to support the student's inquiry learning activities. With the increasingly popularity of internet, it is affected student's study and everyday life. Using internet, it can improve students' subjectivity of learning. The internet with the advantages of openness, interactivity, sharing, hypermedia and large capacity, those provide favorable conditions to develop and promote the research-oriented teaching pattern. Internet and research-oriented teaching pattern can be complementary each other, promote the research-oriented teaching of exercise physiology course to be carried on effectively.

CURRENT SITUATION OF EXERCISE PHYSIOLOGY TEACHING PATTERN

Exercise physiology as one of the backbone course of physical education or sports major in the colleges or universities, it is paid a high attention whether teachers or students. However, it is not so optimistic as a matter of fact, the reasons are originated from various aspects, the mainly limitations are about the teaching conditions, teaching means, the educational system and other related factors such as students' attitude and teachers' initiatives. Due to the limitations of teaching conditions, multimedia teaching style is still the only simple teaching means. The advantages of this style are convenient to imparting a large amount of teaching contents in a short time for teachers but the limitations are very obviously, it can only teach knowledge from books or teaching materials, not effectively motivate the students' learning initiative and innovative thinking. But there are so many contents with theoretical and abstract knowledge of exercise physiology and the contents are not ease to be understood and mastered by students, such as neural electrophysiological phenomenon, the molecular mechanism of cardiac muscle contraction work, the basic principle and the regulation of neuroendocrine on muscle motor function and so on. As a teacher, if you can not deal with those problems appropriately, the students will gradually appear to feel monotonous in the class and it is difficulty to achieve good teaching effects.

POSSIBILITY OF RESEARCH-ORIENTED TEACHING BASED ON THE INTERNET

Wealthy of network learning materials cause students to seek knowledge: In the internet environment, there are

lots of resources on exercise physiology, including all kinds of Bulletin Broad Systems (BBS), coursewares, electronic books and related journals and scientific news. Some of these resources are belongs to special sports science BBS, such as <http://www.vo2max.com.cn/> and some are attributed to comprehensive BBS, such as <http://www.soudoc.com/bbs/index.php>, <http://www.dxy.cn/> and <http://emuch.net/bbs/>. At the foreign country, there are also many other websites or associations with kinds of exercise physiology resources. Such as International Federation of Sports Medicine (FIMS), American Medical Society of Sports Medicine (AMSSM). At the same time, exercise physiology is a branch of physiology, information or knowledge related with human physiology is more abundant. Students can ask some problems on the Internet for help directly, usually, they can acquire the satisfying explains or answers from the internet.

Independent study cause to motivate the learning

enthusiasm: Equality of virtual network space, make the traditional relationship between the teachers and students completely changed. Traditionally, it is teacher-centered, students passively accept knowledge from teachers. This kind of teaching mode is changed with the help of internet which is one-to many. The one-to-many teaching style cannot satisfy the demand of student individual character, that is to say that students are lack of effective communication channel with teachers or with other students (Zhang and Zhang, 2003). However, in the internet environment, the virtual network has provided a broad platform for discussing or studying exercise physiology questions or problems as group and it has also built a smooth channel for communicating or interacting equally between students and teachers. Moreover, with the help of internet platform, persons who involve to discuss the exercise physiology questions or problems, will not limit whether the students who are learning or teachers who are teaching exercise physiology knowledge. So, it will have the questions discussed more extensive and deeper. In this platform, the position of teachers is equal to students', this kind of teaching mode is benefit to make a change from teacher-centered teaching style to student-centered learning pattern and it is in favor of improving the ability of autonomous learning for students.

Keep pace with the times of research-oriented teaching

pattern: Network as one of the most widely communication platform, has been dug into various aspects of people's life. Using of the internet platform to promote the research-oriented teaching activity, teachers can solve many problems which are not easy to be solved

by traditional teaching means. The network platform including personal bokee, twitter, BBS, QQ, E-mail *et al.* provides a good environment for teachers to carry out their research-based teaching activity. Fully using the internet platform, teachers can accurately grasp the teaching contents to carry out the research-oriented teaching activity and evaluate the teaching effect. In this environment, teachers can create some problems which need students to study and explore by means of research-oriented teaching activity. After then, students are required to fulfill their tasks which are selected by themselves according to the demands of the research-oriented teaching. Students then make full use kinds of resources by library or on internet to carry out their exercise physiological topics, they can make relevant social investigation and practice, interviews or other research activities to answer their questions. Resources on the internet are rich and varied, on some hot physiological questions, usually, there are special websites offering some special information, such as the changes of blood pressure in the four chamber of the heart in the cardiac cycle, many websites offer pictures and images to vividly show the changes of blood pressure and exhibit their relationship with the cardiac cycle. This kind of teaching mode can avoid students learning by rote and deepen students to understand their knowledge, motivate their learning interests.

CONSTRUCTION OF RESEARCH-ORIENTED TEACHING PATTERN BASED ON THE INTERNET ENVIRONMENT FOR EXERCISE PHYSIOLOGY COURSE

Research-oriented teaching pattern need to keep the teaching contents with the feature of uniqueness, comprehensiveness, openness and practicability. It should pay more attention to collect the data according to problems, after discussing among classmates or between teachers and students, the conclusion will come to be draw. In this process, the research-oriented teaching pattern is realized with the help of the internet (Bai *et al.*, 2009). Because of the internet with the convenience, interactive, space and time-free, resources with the advantage of universality and richness, this provides a convenient environment to create a new open learning approach to research-oriented teaching. Internet extends the time and space for teaching and learning, so it is very important condition to realize this teaching mode. The purpose of research-oriented teaching is to change the position of students passive learning identified knowledge which is from teaching materials. Teachers build an open learning platform, offering the

opportunity to acquire knowledge from multi-channel and to apply their knowledge, so as to improve the students' ability to solve some actual problems. Besides, the research-oriented teaching pattern needs to change the current evaluation systems which are centered by students' test or examination (Ma, 2010). This change requires the focus of teaching and learning is no longer acquisition of knowledge passively and the students need to learn how to acquire their necessary knowledge, how to apply of their knowledge, so as to make students independent thinking and with the ability of autonomous learning.

Solving the practical problems as essential requirements of the research-orient teaching pattern:

The research-oriented teaching pattern of exercise physiology course requires that teachers should design some topics or questions with scientific value or arousing students' interest according to the basic theory and basic concept in the teaching material and students can build or design some research topics according to the teacher's question. In this process, it may be tedious and boring of research-oriented teaching for teachers and students. In this stage, teachers must deliver the theoretical knowledge and learning means to students, teachers must implement some flexible teaching patterns and make full use of network resources, so as to meet the research-oriented teaching demand and fulfill the teaching task. Moreover, teachers should apply various channels or styles to solve some problems which are met by students during the research learning, such as discussion, investigation and interviews and other practices. Other communication channels with students such as video conference, animation teaching and multimedia course are also very effective. At the stage of creating some scientific problems for research-oriented teaching, the internet can also help students create a virtual classroom environment from collecting rich background materials, experts' lecture materials and some other valuable data. Students can also determine their research subjects with the teacher provided questions or confused problems combined with the previously learned knowledge.

Group discussing as the basic style of the research-orient teaching pattern:

The implementation of the research-oriented teaching pattern should build the special interest group. Modern social division of labor is more and more clear, the completion of a task usually need to work in coordination and also, the spirits of coordination are also the important aspect of modern well-rounded quality education system. In the research-oriented teaching pattern, the students can solve

their problems in coordination around their interest topics. First of all, because of the different sports physiology knowledge of students, it can activate students to master more previous relevant basic knowledge and theory with discussion or argumentation, so as to link between the current research questions and their learned basic knowledge. Second, each students can fully express their own views and understanding the problems under the condition of discussion and argumentation, students often can appear to conflict with some points, they can set up their own opinions for reflection and judgment (Guo *et al.*, 2010). Finally, the discussion and argumentation can give students to create a positive exploration and independent innovation environment. In this case, all students have the opportunity to participate in exploring, as long as the team identified a subject with some aspect of scientific values, or the subjects closely related with training practice. In this process, there will be different answers with different understanding of these questions, the research group may collect and summarizes all these answers and analysis the deviation which was caused in different members of the group. In this stage, the roles of teachers are to teach their correct thinking method, so as to make students know how to study and how to think.

Focusing on the process of thinking problems of the research-orient teaching pattern: The implementation of research-oriented teaching pattern should attach great importance to the thinking process of problem solving and teachers should not too much emphasize the correctness of the result. Mr. Hainer, a German educator had said that it would hinder the students study hard if teachers predict results or hint the solution to students. Teachers should not to much go after the correct conclusions in the process of inquiry learning and should attach importance to students' thinking process of problem solving. For example, the approaches of excitability on neuromuscular can be divided into electric transmission and chemical transmission, what kind of approach is more accurate? What is the distinguishing feature of the energy metabolism in the exercise of weightlifting, 100, 800 m and marathon? Why the aerobic exercise is one of the best ways to improve cardiovascular function, etc. To answer these questions, students must have comprehensive exercise physiology knowledge and fully understand the relationship of exercise with aerobic metabolism. In the process of solving these problems, teachers should not give any hint in order to show the student's thinking process.

Evaluation systems focusing on the research process of the research-orient teaching pattern: Openness is the

important characteristics of research-orient teaching pattern, it is focused on the cultivation of innovation spirit and practice ability (Sun *et al.*, 2011). In this process, teachers should pay attention to provide students more opportunities for participation and practice, make students improve the innovation ability. Because different learning materials may hold their own opinions, students' learning materials are not confined to teaching materials which are provided by teachers. At the same time, openness is the essential property of the research-orient teaching pattern which requires teachers will not be used the global summative evaluation model for students' academic but the whole process of evaluation, that is a combination of formative assessment with summative assessment or a combination of classroom teaching with extracurricular autonomous learning, utilization of diversified styles of examination or appraisal, so as to promote the reform of examination system. The composition of a student's academic performance also should be diversified which should involve in various inquiry learning activities, research achievements and their final academic examination. Also, in order to encourage students' inquiry learning activities, students also should be concerned who are achieved good performance in research learning, though the final examination is not so good.

CONCLUSION

It was important to increase the teaching time of practical course for exercise physiology: Exercise physiology was an experimental science and the object of study is human being. Its knowledge hierarchy was mainly obtained from the experiments or measurement from human body, so it was important to carry out the practical course for exercise physiology combined with sports. As the beginner of the college or university students, it was appropriate to select some practical and common experimental methods and measurement index (e.g., heart rate, blood lactic acid and hemoglobin) and design some practical activities according to current conditions and then they took themselves part in this practical activities to measure and collect data. The teachers would solve some problems which students might occur on the spot, so as to cultivate the students' ability to apply their knowledge.

It was prerequisite to construct a convenient platform for research-orient teaching pattern: In the process of the research-oriented teaching, it involved in the teachers how to teach and students how to study, this interactive process was fused each other during the research-oriented teaching. The platform based on the

network provided a variety of convenient conditions and teaching or studying resources. First, the network environment should be built to met the research-oriented teaching demand, exercise physiology knowledge or related learning materials can be retrieved or searched by students on this platform. Secondly, the BBS should be run to carry out online discussion and sharing. Lastly, some communication software (MSN, QQ, skype and other instant messaging software) should become an essential tools for students to link up online or offline with teachers or experts.

It is necessary to reform the evaluation system for students' academic achievement: The research-oriented teaching pattern focused on training practical ability and innovation spirits, emphasis on process rather than the results. So, the academic achievement evaluation system of research-oriented teaching should also reflect on the process of the students' inquiry learning. On the evaluation purpose, it should adhere to cultivate students' innovation spirits and improve the students' practical ability, rather than the examination results. In the evaluation principle, it should insist on the principle of guidance and incentive, teachers should give students enough encouragement even a tiny of progress or achievement in the inquiry activity (Xu, 2010). Teachers should pay more attention to student's individual difference, so as to construct the personalized target and principle of evaluation in the process of research-oriented teaching activity. On the evaluation standard, teachers should not regard the examination scores as a single evaluation standard, pay more attention to evaluate the learning process and learning attitude, attach importance to students' learning attitude and learning methods and learning ability and the ability to find problems and solve problems in the process of intelligent comprehensive thinking or innovating. The evaluation of research-oriented teaching should be done around the inquiry learning activities, so the formative assessment was usually used. Accordingly, the evaluation content should include whether to have the courage to bear the liability for inquiry learning; whether you can actively solve the problems utilizing various strategies and pathways; whether you can communicate with teachers and classmates to exchange your opinions, share your

ideas and information; whether you can overcome the difficulties to obtain the scientific conclusions or results.

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