

Modular Design and Practical Exploration of College Physical Education Courses under the Orientation of Core Competencies

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ABSTRACT

The modularization of physical education courses in medical colleges and universities under the orientation of core competencies is a key path to meet the needs of the medical profession and cultivate the comprehensive qualities of medical students. Its significance lies in assisting professional physical fitness reserves to consolidate physical literacy and meet the physical requirements of medical and healthcare work, strengthening psychological resilience and teamwork to foster social and psychological literacy and cope with occupational pressure, and building lifelong physical education ability to enhance health and professional service literacy and adapt to professional characteristics. However, traditional courses emphasize skills over career adaptation. This article proposes to construct a three-dimensional module system, promote the integration of teaching content with medical scenarios, and establish a multi-dimensional evaluation system, which can provide strong support for the career development and lifelong physical education ability cultivation of medical students.

KEYWORDS

Core competencies; Modularization of physical education courses; Design and practice

1 Introduction

At present, physical education courses in medical colleges and universities mostly follow the traditional models, which emphasize the imparting of basic skills, but neglect the adaptation to occupational demands, failing to meet the requirements of medical and nursing positions for physical reserves, psychological resilience, and lifelong physical education ability. As the cultivation of core competencies has become the core goal of education, the modular design of physical education courses has become the key to breaking the impasse^[1]. This article focuses on the orientation of core competencies to explore the significance and implementation path of modularization in physical education courses of medical colleges and universities, thus helping medical students achieve career development and healthy growth.

2 Significance of Modular Design and Practice of College Physical Education Courses under the Orientation of Core Competencies

2.1 Assist Professional Physical Fitness Reserves to Consolidate the Foundation of Physical Literacy

Medical college students will engage in medical and healthcare work in the future. From standing for long periods in the ward to complete ward rounds, intravenous drips and other nursing operations, to the explosive power required for quickly moving patients and assisting in rescues in emergency scenarios, and further to the endurance and concentration needed to maintain a stable posture for extended periods during surgeries, every demand is directly related to work efficiency and patient safety. Therefore, special attention should be paid to the cultivation of students' physical fitness. The modularization of physical education courses under the orientation of core competencies can precisely target the characteristics of the medical profession to exert focused efforts. For instance, the nursing major focuses on integrating endurance training of long-term standing to help students adapt to the physical burden of high-frequency ward care in advance. In addition, the clinical medicine major intensifies cardiovascular training to enhance the physical endurance during emergency rescues through methods such as interval running and rope skipping. This design can not only effectively meet the rigid standards of physical functions for medical and nursing positions, but also enable students to clearly perceive the deep connection between physical training and career development. Thus, it allows students to proactively increase their physical reserves for future career demands through training, and integrate the understanding of health management and physical adaptation into their daily lives, so as to lay a solid foundation for successfully dealing with the physical challenges of medical and healthcare work in the future.

2.2 Strengthen Psychological Resilience and Teamwork to Foster Social and Psychological Literacy

Medical and healthcare work often involves high-pressure and high-risk professional environments, such as responding to emergency rescues, managing doctor-patient relationships, and collaborating in teams to complete surgeries, all of which require strong psychological resilience and efficient teamwork capabilities^[2]. Under the guidance of core competencies, the modular design of college physical education courses can cultivate the psychological resilience

and teamwork ability needed by medical and healthcare professionals. For medical students, team ball games are not merely simple competitive contests. Instead, they simulate the precise connection of instrument passing in surgery through basketball passing and cooperation, and replicate the scene of division of labor and mutual complementary among medical teams in volleyball offensive and defensive collaboration. Such activities can guide students to learn to make calm decisions and adapt flexibly in a tense atmosphere, thus gradually overcoming their avoidance of difficulties. Meanwhile, the modular design of physical education can help students perceive professional pressure and temper their collaborative capabilities in advance. It assists them in honing their psychological resilience and understanding the essence of teamwork during sports, truly internalizing social and psychological literacy as the confidence and self-awareness to address the challenges of medical care in the future.

2.3 Build Lifelong Physical Education Ability to Enhance Health and Professional Service Literacy

From the perspective of exercise physiology, short-duration and high-frequency sporadic exercise can effectively maintain cardiopulmonary function and improve muscle endurance. This function is precisely suited to the fast-paced and fragmented occupational characteristics of medical staff, making it difficult for them to acquire complete and fixed exercise periods and to obtain standard exercise venues at any time. Moreover, given the special professional nature, medical staff require more convenient and sustainable exercise methods. However, the exercise that relies on fixed venues and full duration in traditional physical education courses is clearly unable to meet their long-term health needs. Therefore, for medical colleges and universities, the cultivation of students' lifelong physical education ability is the guarantee for their long-term provision of vocational services. The modularization of physical education courses accurately captures this core point, breaks away from the misconception in traditional physical education that emphasizes skills over application, and centers on the dual goals of lifelong physical education and health services, to naturally integrate current physical health maintenance with the cultivation of sports cultural literacy. This design can guide students to abandon the traditional perception of exercising merely for the sake of attending classes, deeply understand the intrinsic connection between exercise and health, and find a personalized and long-term sustainable exercise method. Furthermore, even when faced with busy medical work in the future, they can maintain their health using fragmented time, relying on the health awareness and capabilities established through modular learning. Moreover, in professional scenarios, they can transform sports and health knowledge into part of professional services and provide patients with scientific health guidance. Therefore, lifelong physical education can truly become a core ability to support their career development and improve their quality of life, demonstrating the profound care of college universities for students' long-term development.

3 Implementation Paths for the Modular Design and practice of College Physical Education Courses under the Orientation of Core Competencies

3.1 Construct a Three-dimensional Modular System to Balance the commonalities of Core Competencies and the Characteristics of Medical Professions

The three-dimensional module system of physical education courses in medical colleges and universities is based on a structure combining compulsory, selectively compulsory and elective courses, and is designed in a hierarchical and progressive manner in response to the special needs of the medical profession. It not only ensures the universal cultivation of core competencies, but also precisely meets the professional development needs, reflecting a dual concern for students' all-round growth and future careers.

The core basic module, as a compulsory content, serves as the foundation of the entire system, with a focus on strengthening the health management ability within the core competencies. From the perspective of exercise physiology, cardiovascular training in general physical fitness training can enhance the aerobic capacity of the body, laying a solid foundation for medical staff to cope with the physical exhaustion of long shifts and emergency rescues. Basic strength training, targeting the limbs and core muscle groups, enhances physical support for helping patients turn over and move equipment in daily life. Meanwhile, the common sense of sports medicine integrated into the module can explain the principle of joint force and muscle protection methods in combination with human anatomy knowledge, helping students avoid the risk of sports injuries in their future professional operations.

The medical professional-oriented module is presented in the form of optional compulsory courses, which precisely matches the content based on the characteristics of different majors. The long-term standing endurance training emphasized in the nursing major enhances the fatigue resistance of lower limb muscles through progressive static support exercises, which is suitable for professional scenarios such as daily ward rounds and continuous infusion operations. The exercise prescription formulation and rehabilitation equipment-assisted training integrated into the rehabilitation major, in combination with the foundation of sports rehabilitation, guide students to integrate physical training with medical rehabilitation knowledge, laying a foundation for guiding patient rehabilitation in the future.

The interest expansion module is offered as an elective course, providing a variety of projects such as Tai Chi, yoga, and badminton. Due to their low venue requirements and controllable movement intensity, Tai Chi and yoga are suitable for the fragmented time characteristics of future medical and healthcare work, enabling students to practice even during their breaks between shifts. Badminton and other ball games balance competitiveness and sociability. They can not only train students' reaction abilities, but also help them relieve professional pressure. This module design fully respects individual differences among students, and enables students to find long-term sustainable exercise methods and gradually develop lifelong physical education habits through stimulating their interest, thus providing a sustainable path for maintaining professional physical fitness and ensuring physical and mental health in the long term in the future^[3].

The three modules can be organically connected through the academic credit system: the compulsory module ensures the fulfillment of core competencies, the optional compulsory module enables precise matching of professional abilities, and the elective module activates the motivation for long-term exercise. The hierarchical and progressive design enables physical education courses to not only cover the core demands of health management and career adaptation, but also take into account individualized growth. Therefore, students can consolidate their core competencies and accumulate physical fitness and ability reserves tailored to medical professions through module learning.

3.2 Promote the Integration of Teaching Content and Medical Scenarios to Strengthen the Professional Adaptability of Core Competencies

To achieve the modularization of physical education courses, colleges and universities should proactively align with teaching content with students' future work scenarios in hospitals. Both physical fitness training and theoretical teaching should be designed around the practical needs of the profession to meet students' professional development requirements.

The physical fitness training module takes the simulation of professional scenarios as the core to make the training content precisely match the physiological workload of medical and nursing positions. For instance, in the simulated emergency patient handling training, based on the stable support function of the human core muscle group for the body, the movement training for low-center-of-gravity handling of manikins is designed. This not only strengthens the upper limbs and waist and abdominal strength, but also standardizes the force application posture through repeated practice, laying a solid foundation for future emergency patient transportation and avoiding medical staff's lumbar strain. In addition, in simulated long-term standing training in the outpatient department, following the physiological mechanism of muscle anti-fatigue, an intermittent mode is adopted to gradually enhance the endurance and blood circulation capacity of the lower limb muscles. This is suitable for the professional scenarios of nurses' continuous ward rounds and infusion operations for several hours on a daily basis, and enables students to develop the awareness that physical fitness services professional operations through exercise.

The theoretical teaching module emphasizes the cross-integration of sports and medical knowledge, and relies on theories such as human anatomy and exercise physiology to make knowledge learning more practical^[4]. In the content of sports injury prevention, based on the physiological curvature and muscle attachment characteristics of the cervical vertebrae and lumbar vertebrae, it explains the overuse injuries that medical staff are prone to suffer from due to prolonged head-down writing of medical records and bending over for operations, while simultaneously teaching targeted stretching and strength training methods. In the scientific exercise module, students are guided to apply the knowledge of the correlation between blood sugar regulation and exercise intensity to design an exercise plan of "moderate-to-low intensity, short-duration and multiple-session" for diabetic patients, so as to control the exercise duration and heart rate range in combination with the blood pressure fluctuation patterns of hypertensive patients. The cross-teaching can complement physical education theory with medical professional knowledge. In this teaching environment, students can not only master scientific exercise ability, but also transform it into vocational skills to guide patients, truly achieving the coordinated growth of sports core competencies and medical professional skills, and allowing course content to serve the improvement of vocational abilities.

3.3 Establish a Multi-dimensional Evaluation System to Ensure the Implementation of Core Competency Cultivation

The assessment and evaluation should pay attention to the learning process and professional demands. Especially for medical colleges and universities, the multi-dimensional evaluation system of modular teaching of physical education courses should take the physical education module as the core carrier. It needs to cover the key dimensions of core competencies, and ensure the implementation of teaching effects through scientific weight distribution and evaluation content design.

The process evaluation accounts for 40%, with its core lying in capturing the cultivation trajectory of students' physical education attitudes and active learning abilities in their core competencies based on the learning process of physical education modules. The evaluation mainly focuses on the participation details in the physical education module classes. For instance, in the medical scenario simulation training of the vocational-oriented physical fitness module, it

observes whether students can actively standardize their force application postures and actively cooperate with team division of labor when completing the simulated emergency patient transfer. Besides, the extracurricular exercise check-in focuses on the easily implementable projects in the physical education module, and record the frequency and quality of students' self-planned exercises according to the fragmented schedules of the medical major, so that the formative evaluation can truly serve the competency cultivation goals of the physical education module.

Skills and physical fitness assessment accounts for 30%, adhering to the skill-oriented core of physical education modules while moderately integrating medical-related application scenarios. The regular physical fitness test is the fundamental evaluation content of the physical education module, which can ensure that students master basic motor ability^[5]. On this basis, an assessment of medical-related physical education skills is added to evaluate students' ability to provide simple handling of muscle strains and joint sprains, which is an extended application of physical education skills. The demonstration of basic rehabilitation exercises is related to the sub-module of rehabilitation training in the physical education module, evaluating students' ability to transform sports movements into basic rehabilitation guidance. It not only conforms to the essence of physical education, but also reflects the adaptability of the medical profession.

The professional adaptability assessment accounts for 30%, with an emphasis on the transformation of knowledge from the physical education module into professional qualities. The evaluation task should be designed based on the content of the physical education module, enabling students to design low-intensity rehabilitation exercise plans for elderly patients in combination with the exercise prescription knowledge learned from the physical education module. This can examine students' application ability of physical health knowledge. In addition, according to the occupational disease prevention content in the physical education module, it can analyze the sports intervention strategies for cervical spondylosis among medical staff, and evaluate the depth of students' thinking in integrating what they have learned from the physical education module with occupational scenarios, ensuring that the value of physical education module teaching is effectively implemented

4 Conclusion

The modular design of physical education courses in medical colleges and universities under the orientation of core competencies can effectively break the predicament of traditional courses emphasizing skills over vocational adaptation. Through a three-dimensional module system, the teaching content integrating medical and physical education knowledge, and a multi-dimensional evaluation, it not only helps to consolidate the physical, social psychological and health competencies of medical students, but also promotes the cultivation of their professionally required abilities. In the future, it is necessary to continuously optimize the adaptability of modules, and deepen the cross-integration of medicine and physical education, so as to empower the career development and lifelong physical education of medical students, and contribute to the cultivation of high-quality medical talents.

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