

Observation on Current Situation of Higher Pharmaceutical Education in China from a New Perspective

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Abstract. Objective: This paper focuses on current higher pharmaceutical education in China with special emphasis on problems that exist. Those problems include: Rapid building up of programs based on demand for pharmaceutical specialists; Non-uniformity of program outcomes and ability to satisfy industry needs; Lack of clear educational goals and implementation means; General misunderstanding on how pharmaceutical education fits into existing higher education programs. **Methods:** On the basis of comprehensive consideration, a novel perspective, i.e., ecology, is adopted to integrate pharmaceutical education with existing medical education and to seek the solution to these problems. **Results:** Based on the analysis through ecological aspects, some measures are suggested that accurate orientation and characteristic development of higher pharmaceutical education should be carried out, including: diversification of higher pharmaceutical education, structure optimization of talent cultivation to meet social needs as well as cooperative innovation of colleges and enterprises. **Conclusions:** It is expected to exactly understand to the current situation of higher education in pharmaceutical speciality from ecologic perspective and provide a reasonable countermeasure.

Introduction

Recently, the classification construction of high education in China is an inevitable trend. Academic university and application university are two basic types in the future of China's higher education. So, how to achieve an accurate orientation and characteristic development of the university becomes a hot topic in research of high education. In this century, internationalization of higher education provide more and more space for its development along with the advent of knowledge economy. As a result, students majoring in pharmaceutical speciality have more opportunities to enjoy the growing supports from national policy. Now, higher pharmaceutical education is driving into the fast lane, and the number of universities having pharmaceutical speciality are increasing rapidly. China's higher pharmaceutical education achieved a rapid development and reached an amazing scale. However, a few problems of China's higher pharmaceutical education have also exposed in the process of its rapid development.[1-4]

Firstly, in some medical colleges, pharmaceutical speciality was set up rapidly without a clear goal of talent training and their teaching plans were indiscriminately imitated from other colleges or universities. In addition, the courses were often arranged at will and the knowledge system of so-cultivated students was not integrated. Those colleges are commonly lack of distinctive features, and the so-cultivated students are short of personality and professional skills, which led to education homogeneity and difficulties in employment.

Secondly, some medical colleges carried out their teaching activities without setting them under the background of international higher education nor the development of medical industries, so their teaching means still accepted the old model. Consequently, innovation ability and comprehensive quality of the students have distinct gaps to that of the international demands. In this case, knowledge structure of so-cultivated students is often disjointed with modern industry, and they will lose the advantage of competition in job position.[5-6]

Thirdly, some school runner cannot master the regularity of higher pharmaceutical education, especially under the background of classification development of high education in China. In fact, they continue to use the same mode to implement the higher pharmaceutical education without distinguishing the different demands between academic university and application university. In other words, they did not make clear how pharmaceutical education fits into existing higher education programs.

What led to those problems? In generally speaking, the following factors should be taken into account.

The scale of China's higher education in pharmaceutical speciality is being expanded, as a function of rapid development of new medical industry and lowered threshold of building school. By the end of 2014, China has set up 273 universities with pharmaceutical specialties. The numbers increased by 23.9% as compared to that of 2009 and increased by 95.0 % as compared to that of 2004(Figure 1) .Enrollment scale of higher pharmaceutical education increases year by year. The system of higher pharmaceutical education includes most of universities up to now, that is, comprehensive universities, local undergraduate colleges and higher vocational colleges. The key role of higher pharmaceutical education is to provide a platform for cultivating students who should have scientific thoughts and professional skills to participate and enhance the sustainable development of medical industry, and also aiming at serving the development of medical economy. Hence, higher pharmaceutical education has many classical features relevant to medical industry, for example, trading objectives, speciality structure and curriculum system.

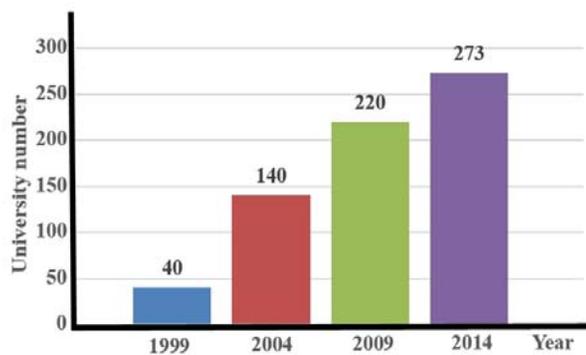


Figure 1. Numbers of China's university that set up pharmaceutical speciality in different years.

In the circumstance of enrollment expansion and in term of the policy of allowing setting up specialty independently, quite a number of universities could not avoid purposelessly carrying out the pharmaceutical speciality. Traditional medical universities usually pay attention to compare the research subjects, key disciplines and postgraduate training. Newly-built universities with pharmaceutical speciality, however, did not get ready to build new teaching mode. In this case, most of universities are lack of distinct features, and the students are often short of personality and professional skills. Consequently, these students are difficult to win out in the job position. In spite of the situation that some medical universities exit at different running levels, their training objectives and curriculum design are always similar to each other. For most of medical universities, goal of running school, education ideas, and teaching modes have no significantly difference. They failed to show distinguished characteristics on talent training, which was often being called education homogeneity.

During the rapid development of higher pharmaceutical education in recent years, the conformity behavior let many universities lose their discernment on talent needs coming from medical industry. In this case, the knowledge structure of so-cultivated students is always disjointed with the needs of the medical industry. Consequently, they almost have no advantage in employment competition. On the other hand, before the students begins their career, a majority of them need a secondary training which should be provided by the employers. How to strengthen connection between higher pharmaceutical education and medical industries, therefore, becomes an urgent subject to the practitioners in higher education.

As pointed out by the policy of China [7], the government will play an important role in policy guidance and resource allocation by means of reasonable orientation on universities, in order to achieve the following objectives: (1) form unique styles of running school; (2) avoid the tendency of education homogeneity and (3) reach the first class at various areas. Accurate orientation plays an important role for medical colleges, which will make sure a sustainable development in higher pharmaceutical education.[8] In addition to enhancing macro-control of education administration on the following aspects, including speciality setting, enrollment scale and education funds, medical colleges in China could take some novel thoughts for references which have been successfully used. Ecology orientation and green development is one part of China's strategies. So, integration of ecology concept into orientation and development of higher pharmaceutical education will be of great significance for China's education strategies.

Methods

According to Harck's theory, ecology refers to the science which studies all the relationship between animals and environments, including organism and in-organism.[9] The main idea of ecology is set up based on ecological system and ecological balance.

University belongs to an ecological system, which has a unique ecological subject and ecological environment.[2] The university exists in space between ecological subjects and ecological environments. All the individuals in the university belong to ecological subjects.

The organic connections among all the ecological elements in university are achieved by the exchange of materials, energies as well as information, which play an important role in maintaining ecological balance of the university. Such an organic connection results in a certain ecological structure and make the university form an organic entity which could not be

separated again. From the perspective of ecology, higher education in pharmaceutical speciality is just a subsystem in the whole higher education system, which composes of a number of ecological populations of higher pharmaceutical education for running the school. Differences in environment of policy, economy and culture, where the hosts of higher pharmaceutical education live in, led to the variation of education resources and information resources.

Besides, ecological balance is also an important element. Education ecological system has an ability of self-adjusting to ensure structure balance and system function with the goal to maximize the education efficiency. The ecological balance of higher pharmaceutical education refers to a situation that each component in this system, are directed to match, coordinate and complement to the others, for example, the rational distribution of medical colleges, the mutual coordination of environment factors and the mutual adaption between universities and ecological environment.

Based on the above analysis, the view of education ecology should be fully considered in orientation and development of higher pharmaceutical education. We should combine with the actual situation of medical colleges and take into account of all the factors that affect the quality of talent training. Measures are accordingly carried out to optimize the process of talent training, including: diversification development of higher pharmaceutical education, structure optimization of talent cultivation as well as cooperative innovation of colleges and enterprises.

Results and Discussions

Diversification Development

Diversity is one of the most important principles for the view of ecology, which put forward that the system of ecology should process diversified structure and multifarious products to avoid the risk and enhance the stability of system. Rational allocation of the resource is the premise to ensure sustainable development. Reasonable classification and diversified development are not only the needs of universities, but also the inherent requirement of social progress. The rapid increase of new medical industry starves for talents at different levels and different types. Scientific classification and reasonable setup in higher pharmaceutical education are helpful to satisfy the requirements from the diversification development of medical industry. Vice versa, the needs from diversification development of medical industry will also enhance reasonable classification and accurate orientation of medical universities. Higher pharmaceutical education is composed of various type of medical universities. Each university should have different orientation in talent training, therefore, to form their own features and build different approaches of characteristic development.

It was widely accepted that evaluation had the guiding role in running higher education. At present, the needs for professional talents are at multi-levels, so evaluation standard should be different in universities of different levels. Classification evaluation is in urgent need. Evaluation index should be specialized. For example, qualification evaluation should be carried out for newly-built colleges, and audit evaluation should be implemented for college which has been subject to the previous evaluation. The audit evaluation is conducted regardless of ranks and is emphasized on the role of guidance, which will make the universities realize their orientation and give ideas on their development direction. To facilitate the formation of pharmaceutical characteristics, evaluation index of some other

successful universities could be adopted for reference, so as to establish multi-level evaluation systems. Characteristic and differentiation of the universities should be formed with the help of rational allocation of education resources and classification evaluation on the situations of running school. According to the difference of hosts and regions, classification standard and evaluation principle of higher pharmaceutical education should be set up to ensure the rational distribution for different types of universities at their corresponding levels and form their own characteristics.

To better understand the orientation of higher pharmaceutical education, we should introduce another concept in ecology system, that is, ecological niche, which refers to the role or the way of life of an organism in its biological community. ¹² Ecological niches abides by the general principles of universality in all ecological system, and also applies to education ecological system because education system possesses almost all the attributes of ecological system. However, the modes to cultivate talent at different levels of universities are excessively similar to each other, and there is no obvious difference among them. The goals of setup universities having distinct styles and characteristic disciplines are far from being realized up to now. There is a phenomenon named niche overlap of talent training, which is possible to result in simplification and imbalance in the talent proportion, and also result in difficulties to students' employment. The orientation of medical colleges is often influenced by many ecological factors. The extent and the scope of these factors are influenced with the change of qualities and types of universities. Each type must seek their own niche, that is, determine their own position in higher education system according to their own resources, advantages and characteristics.

Structure Optimization

According to the principle of ecological development, development is a gradual and well-organized process in which the system forms and the function turns better. It should be emphasized on how to improve the function, rather than the scale expansion. It aims at the service efficiency to society development and to economy development, rather than the quantity of products. Local colleges are encouraged to transform into application education, in order to make speciality structure and hierarchical structure satisfy talent needs. The main function of universities is to train students with high levels in order to conform to social requirements. Therefore, they should carry out the market-oriented talents cultivation at different types and different levels and regard it as their own duty. School level and talent structure should be further adjusted so as to cultivate multi-level students to satisfy social needs. Medical colleges should further deepen reform of talents training mode and optimize education structure corresponding to industrial structure, via various approaches, such as graduate education, undergraduate education, tertiary education, vocational education and adult education. Medical colleges should meet the talents requirements from scientific and technological innovation and industry upgrade by training talents of application type, so as to set the students in proper positions and fully show their abilities in the process of serving economic development and social development. Current higher education pharmaceutical system should speed up the development of vocational education, expand the scale of practice course, and strengthen service-oriented education for undergraduates.

Cooperative Innovation

In the scope of ecology, mutualism is also an important concept, which refers to the cooperation relationship in which individuals of different species lives together, benefit each

other, and can also normally survive while leaving each other. Medical colleges and relative enterprises are inseparable and mutualistic to each other. Medical colleges and related enterprises are also in the relationship of mutualism. Through cooperation with the enterprises, the colleges can get rich resources of practice to make up for the inadequacy of their own resource and ensure the talent training in a real environment, where the students participate in research projects and achieve the ability of scientific research or to solve practical problems. Meanwhile, medical enterprises are promoted by technology innovation and finally harvest pharmaceutical talents.

Conclusions

Facing the challenge to China's higher pharmaceutical education, for example, serious homogeneity phenomenon of talent training, which led to the employment difficulty of students, and weakened connection between higher pharmaceutical education and medical industry, the perspective of ecology is taken into account for the first time, to search for the essence of current status of higher pharmaceutical education and to give new thoughts on how to solve those problems. Some suggestions are given that orientation and characteristic development of higher pharmaceutical education could be emphasized, the key points include: diversification of higher education in pharmaceutical speciality, structure optimization of talent cultivation to meet social needs and cooperative innovation of colleges and medical enterprises. In view of the fact ecology orientation and green development belongs to one part of China's basic policies, integration of ecology concept into orientation and development of higher pharmaceutical education will be of great significance for China's education strategies.

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