Research on Teaching Reform of Science and Engineering in Local Applied Universities

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Keywords: Local science and engineering universities, Practice-education

Abstract: As an important part of China's higher education, local science and engineering universities shoulder the important task of cultivating high-quality application-oriented talents for the country and local. And it will play a decisive role in promoting technological innovation and realizing high-tech industrialization. This paper uses literature analysis method, induction method and case analysis method to construct a practice-education system of local science and engineering universities which is based on ability and runs through the whole process of talent training.

1. Introduction

At present, China's practical education is in the initial stage of exploration, no matter in theory or in practice. Although many colleges and universities often talk about attaching importance to practical education and carrying out some practical education activities in combination with their own characteristics. In fact, most of them stay at the level of practical teaching links, but there is not enough rational thinking and systematic research on practical education. And practical education has little practical effect. Therefore, this study takes systems theory and situational learning theory as the theoretical basis which is summarizing the practical education of local engineering colleges and universities in China and the problems existing in the model overseas, on the basis of the practice education experience to try to from the target, content, management, and security four aspects to build all-round and the whole process of practice education system. It can promote the development of local science and engineering practice education in colleges and universities. Different types and levels of colleges and universities have different objectives of talent cultivation, and they have different requirements for the talents they cultivate. Therefore, the objectives and practices of practical education in colleges and universities of different types and levels also have their own characteristics. The construction of the practical education system in local science and engineering colleges must be based on its talent training objectives and provide theoretical basis for the development of practical education in local science and engineering colleges[1].

2. Definition and Discrimination of Relevant Concepts

Local colleges of science and engineering mainly refer to the colleges and universities of science and engineering in China's higher education structure system, which mainly serve local economic construction and social development. In terms of personnel training, most of these universities are universities of science and technology, which mainly train high-quality application-oriented talents of undergraduate level, or universities of science and engineering. It has the following characteristics[2]:

Face local, serve for local economy construction. Colleges and universities have a very important stake in the development of local economy, culture and society. According to the development process of local colleges and universities, local colleges and universities play an important role in the development of local economy, culture and society. From another perspective, local colleges and universities are deeply influenced by local excellent traditional culture and have their own characteristics of culture and resources.

The goal of talent training is oriented to high quality applied talents. This is the biggest characteristics of the talent training mode of local science and engineering colleges. The goal of

  DOI: 10.25236/icatpe.2019.009

talent training in local science and engineering colleges is to cultivate high-quality application-oriented talents who have strong theoretical knowledge, practical skills and application ability and serve the first line of production, construction and management.

With “teaching type” give priority to. The main task of local science and engineering universities is to cultivate high-quality application-oriented talents for regional economic and social development. Therefore, teaching is the central work of schools and teachers. But emphasize teaching does not exclude scientific research. Teaching and research is promote each other, However, in the selection of scientific research content, local science and engineering universities should first closely combine the actual needs of school personnel training and teaching reform, and give priority to teaching research and applied research. Through scientific research, it promotes the construction of disciplines and specialties and the construction of teaching staff and the improvement of teaching quality and school-running level.

2.1 Practice Education

Practical education refers to the practical activities carried out around the purpose of educational and teaching activities and experienced by students themselves. It includes both for understanding to explore the laws of nature and master the technical knowledge and to carry out the scientific experiment and production practice of the necessary verification experiments, including to solve the actual production and social problems, improve the innovation ability and carry out research, exploration, design, comprehensive practice, but also to understand the social and national conditions, improve the comprehensive quality for the purpose of social practice[3].

Subjectivity. Traditional classroom education is that teachers blindly impart knowledge, students just passively accept education. The essence of practical education is to let students participate in the whole educational process, that is to say, students are the subject and teachers are the dominant.

Openness. School education centres on books, classrooms and teachers. Although it is formal and systematic, it has the limitation of simplicity and closure. Faced with the complex reality, educators often filter information in good faith and conduct positive education to students, thus making school education more divorced from social education. Practical education provides an open educational environment, an open educational form, an open educational content, an open educational process and an open evaluation method.

Comprehensive. First, it can achieve moral education, intellectual education, physical organic combination so as to achieve the goal of all-round education. Second, it can realize the organic combination of self-education, school education and social education. Education is produced in the practice of human production and life, and it is integrated with production and life.

2.2 The Research Methods

The literature method. Read books, materials and documents related to this research as much as possible to comprehensively and correctly grasp the situation to be studied so as to master the relevant scientific research trends, cutting-edge progress and understand a previous achievements, research status, etc[4].

Inductive method. Based on the analysis of the concept and measures of practical education in foreign universities and several typical practical teaching modes, this paper summarizes the enlightenment to the development of practical education in local science and engineering universities in China.

Case studies. Case study method refers to a detailed investigation for a group, an organization or a person and an event. It usually adopts the methods of interview, collecting documentary evidence, describing statistics and so on.

3. The Elements of Practical Education System in Local Science and Engineering Colleges

According to the principle of system theory, we can divide the practical education system of local science and engineering colleges into practical education goal system, practical education content system, practical education management system and practical education guarantee system

which is as shown in figure 1. Among them, the objective system of practical education is the core of the whole system, which to some extent determines the content system, management system and guarantee system of practical education, and it plays a driving role in the whole system. The content system of practical education is the concrete embodiment of the objective system of practical education at the level of concrete operation and implementation. Practical education management system is the basis and quality assurance of practical education activities. It plays a role of feedback and regulation in the whole system. The guarantee system of practical education is the guarantee level of practical education. It is subordinate to the content system of practical education and has become an important factor restricting the effect of practical education to a large extent. The practical education system under the system theory clearly presents the element structure of the practical education system, which is easy to manage and control.

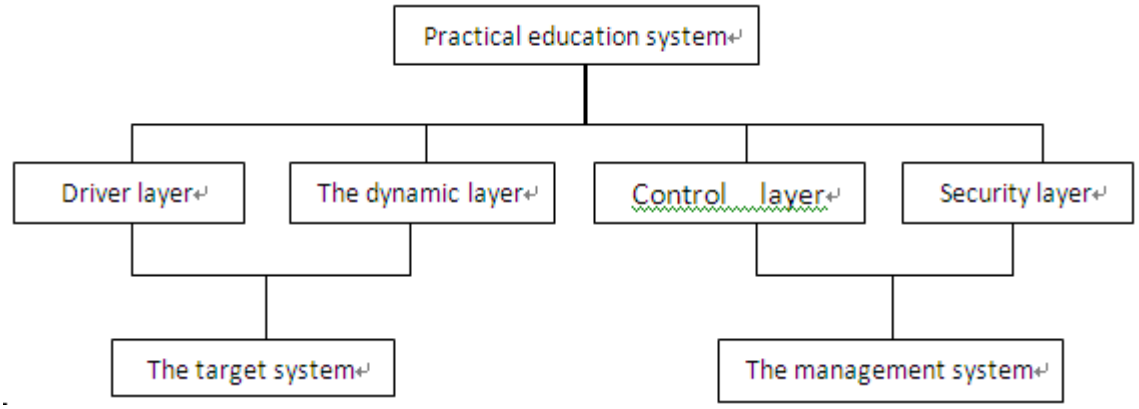

Fig.1 the Practical Education System

4. The Basic Frame of the Objective System of Practical Education in Local Science and Engineering Colleges

In accordance with the principle of constructing the target system of practical education and the basic standards of high-quality application-oriented talents, the target system of practical education in local science and engineering colleges should be based on professional knowledge, take ability as the core, and take comprehensive quality as the basic requirements. Among them, professional knowledge is the basic element, which fundamentally affects the development of ability and comprehensive quality which is as shown in figure 2. The process of undergraduate education, in fact, is the process of imparting knowledge to students through a series of specific courses and forming a certain knowledge structure. Taking ability as the core means that students should take ability as the centre instead of taking the internal logic of the discipline system as the centre to design practical teaching plans and determine practical teaching objectives. Capabilities here include both application and key capabilities. At the same time the cultivation of comprehensive quality as an important part of the target system. The internalization of professional knowledge becomes comprehensive quality, while the externalization becomes ability. Once the ability and comprehensive quality are formed, they will react to the professional knowledge and promote the continuous development of the professional knowledge. In this way, the objective system of practical education established organically links the professional knowledge, ability and comprehensive quality education, thus establishing the relations among them, which are mutually interrelated, mutually reinforcing and mutually reinforcing. The establishment of practical education objectives should involve not only experts of the industry, enterprises and other employing units and researchers of the education department, but also administrators and teachers of school teaching.

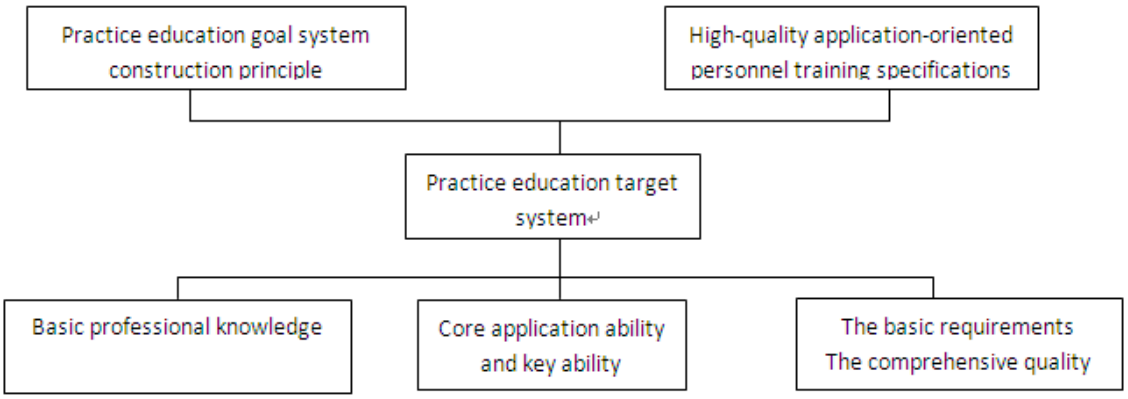

Fig.2 1praetical Education Object System of Local Engineering University

5. The Guarantee System of Practical Education in Local Science and Engineering Colleges

The guarantee system of practical education is the guarantee level of practical education. To establish a scientific and reasonable guarantee system of practical education is an important basis for maintaining and realizing the standardized, orderly and smooth operation of the practical education system in local science and engineering colleges and universities, and it is the fundamental to ensure the quality of practical education. The guarantee system of practical education includes three important conditions, including teachers with practical teaching ability, advanced and complete practical education base and sufficient capital investment.

6. Conclusion

For local science and engineering colleges, practical education is always an important topic. It is important because it is not only the need for local science and engineering universities to achieve the goal of cultivating high-quality application-oriented talents, but also the key to improve the quality of running a school. Therefore, it is of great significance to study the practical education system of local science and engineering colleges. On the basis of summarizing the problems existing in the practical education of local science and engineering colleges and learning from the experience of practical education of colleges and universities at home and abroad, this paper comprehensively applies literature analysis, induction and case analysis to construct a competency-based practical education system which is throughout the whole process of talent training.

Acknowledgement

This work was financially supported by the Higher Education Teaching Reform Project of Heilongjiang Province under Grant No. SJGY20180349.

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