The Reform and Exploration of the Training Mode of Computer Applied Talents Based on Establishing Emerging Engineering Education

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Abstract. The development of the construction of emerging engineering education is an important task for universities and colleges to further strengthen higher engineering education and the training of engineering technical talents. Combining with the new concept, new structure, new mode, new quality and new system of the construction of emerging engineering education, the paper focused on the reform ideas and specific measures for the training of new engineering talents in computer major.

Introduction

Since the beginning of the 21st century, China has made a development strategy of building innovative and new industrialized country, which puts higher requirements and challenges on strengthening engineering education and training talents with high-level engineering skills for China’s universities and colleges. The new challenge requires us to re-recognize the nature and the law of internal development of higher engineering education, to actively promote the reform of specialty construction and talent training mode, to reposition the training objective of applied engineering talents in order to further improve the training quality of engineering technical talents.

The Main Tasks of Local Universities and Colleges to Carry out the Construction of Emerging Engineering Education

In order to actively adapt to the latest development trend of the new round of revolution in science and technology and higher engineering education in the world, and to provide sufficient talent guarantee and intellectual support for China to implement innovation-driven development and industrial transformation, in 2017 Ministry of Education of China proposed the development plan of higher engineering education with the theme of the construction of emerging engineering education, which is an engineering education reform for the fourth industrial revolution, and also is a China's localization response to the reform and development of international engineering education. The construction of emerging engineering education represents the latest development trends and requirements of China’s higher engineering education currently.

In the reform practice of the construction of emerging engineering education, local universities and colleges should combine their own advantages and characteristics. Based on the training of local and new-type engineering talent, focusing on regional economic development, industrial transformation and technological innovation needs of enterprises, local universities and colleges should establish the collaborative education platform and mechanism for school-enterprise cooperation, production and education integration, and innovate the talent training mode to cultivate applied talents with the ability of strong innovation, cross-border integration and engineering practice.

Facing new regional economy, new industry and new technology, the main tasks of local universities and colleges are to deeply combine with industry innovation needs brought about by the development of new generation information technologies such as cloud computing, big data, mobile internet, Internet of Things, and artificial intelligence, to combine with cross-border integration needs brought about by new technologies, new industries and new economy, to combine with
professional job requirements brought about by the transformation of manufacturing methods such as smart equipment and smart factories based on information physics systems. China’s local universities and colleges should promote the teaching reform of emerging engineering education, reposition the training objective of new engineering talents, construct the comprehensive education and teaching system for new engineering talents.

**Repositioning the Training Objective of New Engineering Talents in Computer Major**

In the new round of industrial revolution, the development of new technologies, new industries and new economy has led to a continuous flow of cross-border innovation, and new information infrastructures are getting better and better. Intelligent manufacturing such as intelligent equipment and smart factories based on information physics systems is leading the transformation of manufacturing methods. Modern engineering problems have been closely linked to information technology and big data, which are no longer the problems of a single discipline.

Therefore, it is necessary to comprehensively upgrade the quality specifications of new engineering talents in computer major. Also it is necessary to focus on building multi-dimensional structure of knowledge and capacity, which should include mathematics basic knowledge, engineering ethics and moral quality education, and also focus on cultivating students’ creative thinking, business ideas, global vision, cross-cultural communication, cooperative spirit of group, ability and quality of lifelong learning and ability of using Internet information technology for integration and development.

Specifically, it is necessary to reposition the training objective of new engineering talents in computer major, combining with industry innovation needs, cross-border integration needs and professional job requirements for regional economy brought about by the new generation information technologies such as cloud computing, big data, mobile internet, Internet of Things and artificial intelligence.

**The Reform of Training Mode of New Engineering Talents in Computer Major and Specific Measures**

**Constructing the Training Mode, Mechanism and Platform for New Engineering Applied Talents**

According to the core quality, ability standards and knowledge requirements of new engineering talents, the training mode, mechanism and platform for the training of new engineering talents should be reconstructed. We should give full play to the multidisciplinary advantages of comprehensive universities and colleges, and enhance the comprehensive quality of engineering technical talents through multidisciplinary integration. Through the reconstruction of the general education platform, humanities education, quality education and information literacy are integrated into the first classroom education, and career planning and art education are introduced into the second classroom education, which is able to promote the individualized development of students, improve their sense of teamwork, environmental awareness and legal literacy, and effectively improve their comprehensive quality.

Based on the core quality and ability standards of new engineering talents, with the application ability and innovation ability as the core, we should follow the innovative, comprehensive and full-cycle engineering education concept of the construction of emerging engineering education. Through reconstructing and optimizing teaching resources, teaching conditions, teaching management and teaching implementation processes, and by breaking disciplines and professional barriers, carrying out multidisciplinary and in-depth integration, the training mode is able to be reformed and innovated to meet the training requirements of new engineering talents.

At the same time, through in-depth school-enterprise cooperation and industry-university-research integration mechanism, we should construct the collaborative...
education mechanism and platform, gather educational resources, and further enhance the training strength of new engineering talents.

**Repositioning the Talent Training Direction for New Fields and New Directions in Computer Science**

The cultivation of new engineering talents should be shifted from discipline orientation to industry demand orientation, from professional division to cross-border integration. Facing the regional development of new economy, new industry and new generation information technology, combining with our country’s industrial development plan, through field investigation and research, we are able to further clarify the industrial requirements of the region, lead the professional reform direction with industrial demand, and study the implementation path of transformation and upgrading of traditional computer major. After determining the new professional directions and professional fields of computer science, we are able to reposition the talent training direction of new engineering talents in computer major.

**Constructing the New Type of Education and Teaching System for the Training of New Engineering Talents in Computer Major**

Combining with the training objective of new engineering talents in computer major, following the innovative, comprehensive and full-cycle engineering education concept of the construction of emerging engineering education, and also combining with CDIO engineering education concept, we should strengthen top-level design, and construct the education and teaching system according to the law of engineering education and engineering logic.

In the process of constructing the education and teaching system for new engineering talents, we should combine professional education, engineering education and vocational education with the second classroom education. The extracurricular scientific research activities, the practice activities, the various kinds of science and technology competitions, and the innovation and entrepreneurship training which are all included in the second class education, are the important components of the education system for new engineering talents, so that the in-class activities and extracurricular activities are closely combined, and are able to complement each other and promote each other.

By strengthening the top-level design, we should make the concept and content of innovation and entrepreneurship education throughout the whole training process of new engineering talents, and incorporate innovation and entrepreneurship education into professional education, engineering practice education and the second classroom education.

Relying on the collaborative education mechanism and platform, we should focus on constructing the comprehensive practice platform for the training of new engineering talents. Through further innovation in school-running and cooperation mechanisms, focusing on enhancing application capabilities and engineering innovation capabilities of students, we should bring together the advantageous resources of industry departments, research institutes and enterprises, introduce research and production bases of cooperative enterprises, and establish large-scale off-campus practice bases which are the integration of production, education and research.

**Conclusion**

The construction of emerging engineering education is the inevitable way to strengthen higher engineering education and cultivate innovative engineering talents in China, and it is also a great opportunity for the development of local universities and colleges which should combine with the actual situation, focus on regional economic and industrial requirements, and continuously explore the upgrading path of traditional engineering majors and promote the reform of the training mode of new engineering talents, so that local universities and colleges are able to provide strong talent guarantee and intellectual support for regional economic development and industrial transformation.
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References

