Reform and Construction of Computer Major on Local Colleges under the Background of Emerging Engineering Education

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Abstract—**In recent years, with the accelerated development of the global new economy, the country desperately need the support of new engineering talents, which raises higher requirements for the development of higher education in China. Since in 2016, the "emerging engineering education" was first proposed in China, which is more significant on colleges across the country. Computer major that is** an **enormous engineering category has trained a large number of talents for the society. However, how to pay attention to the new needs of social development and cultivate more high-quality computer professionals is the key for computer major to take the road of connotation development in the future. In this paper, under the background of emerging engineering education, how to carry out teaching reform in local colleges, how to promote the cross-integration of computer subject, and how to strengthen the integration of research, education and industry are discussed in depth. Therefore, the construction of a new project education concept is the future core direction for local** colleges.

Key words—emerging engineering education; computer major; local *colleges; interdisciplinary; innovation*

I. Introduction

The level of higher education is the significant indicator of a country's development capacity and potential. President Xi Jinping ever pointed out that "our need for higher education is more urgent than ever, and the desire for scientific knowledge and outstanding talents is more intense than ever". Since the beginning of the 21st century, the internet has been the main technology, and it has spread widely around the world as a means of information communication. Deng Xiaoping ever pointed out that "science and technology is the primary productive force", and Xi Jinping also pointed out that "innovation is the impetus for the development of science and technology". Nowadays, the state promotes innovation-driven development and implements major strategies such as "One Belt and One Road", "Made in China 2025" and "Internet plus". However, we must recognize that our traditional education model cannot meet the strategic requirements of the country's forward development and cannot adapt and lead to the development of the new economy. We urgently need to develop a number of new engineering and transform and upgrade a group of traditional engineering. Some people think that the old engineering corresponds to traditional industries while the new engineering corresponds to emerging industries [1]. Since the introduction of the "New Engineering" in 2016,

it has formed the "Fudan Consensus", "Tianda Action" and "Beijing Guide" trilogy, which have wide influence and wide coverage. At the same time, it also needs to develop large system engineering suitable for the development of China's existing higher education. Among them, Computer Science and Technology is an important subject in the new engineering system. In this engineering activity based on the application of artificial intelligence, big data and cloud computing, the development of computer will directly or indirectly affect the development of China's engineering education and the trend of national industrial system. However, under the background of the new project construction, how to develop new disciplines, how to carry out the reform of Engineering Education in local colleges, and how to shoulder the due responsibilities and tasks remain to be further explored. This paper will discuss the reform and construction of computer majors in detail, referring to the development experience of engineering education at home and abroad and the situation of computer majors in Chinese colleges

II. The development and construction status of computer major in China

Compared with other majors, computer is a relatively young major and a large major. In 1956, Tsinghua University and Harbin Institute of Technology took the lead in opening the computer major in accordance with the needs of the 12-year development plan of science and technology in China. By 1960, there were 14 universities in China offering computer programs. From 1978 to 1993, the number increased by 123 to 137. So far, computer has become a popular major in colleges and universities all over the country. During this period, with the development of computing technology, some new computer majors were gradually established [2]. For example, in 1998, the network engineering major entered the specialized catalogue issued by the ministry of education. Later, according to the development needs of national software industry and strategic emerging industry, software engineering, Internet of things engineering, information security and other majors have been established one after another, and the pattern of classified training of computer professionals has been gradually formed. In 2012, the ministry of education issued the catalogue of undergraduate majors in ordinary colleges and universities (2012), which officially identified computer as a professional category [3]. According to statistics, by 2016, the major of

computer science in China includes 6 basic majors and 7 special majors, and the number of places has reached 2,956. The number of students in the school accounts for 167% of the total number of students in the engineering school, which is a truly huge major[4].

III. Defects in the Development of Computer Science under the Background of New Engineering

A. Attaching importance to theoretical study, ignoring practice, and leaving theory out of practice

After nearly ten years of construction, the practical teaching training system in local universities has achieved certain achievements in practical teaching and other aspects. Firstly, most of the current practical teaching system is still attached to the traditional class theory teaching. In this way, there is a big gap between the practical training ability of students and the demand of practical engineering application ability. Secondly, the construction intensity and usage rate of the training base are low. During the construction process, the practical training base in the campus cannot meet the needs of local industries and the industry's demand for the practical ability of talents, and is not open enough to students.

B. The design of professional courses is unreasonable and cannot meet the needs of The Times

As the basic element of talent training, the rationality of curriculum design directly affects the quality of talent training. The structural contradictions between the professional setting and the output of talent cultivation, the development of new industries and the demand for talent are obvious. At present, the curriculum system of local universities mainly includes theory teaching, practice teaching and quality development. The theoretical teaching system includes two parts: public and professional courses. Practical teaching mainly includes experimental course, professional practice, course design, graduation thesis design, etc. Quality development mainly includes social practice, scientific and technological activities, discipline competition, innovation and entrepreneurship training and other aspects. In the actual teaching process, the theory teaching and practice teaching can cover all students, but the quality development part is often individual students' participation. In addition, the course structure is not reasonable enough and the teaching content is relatively backward, which is mainly reflected in the fact that some current courses cannot meet the needs of knowledge sharing and cross integration.

C. Lack of scientific innovation ability

Faced with the rapid development of the computer field, it is obvious that the traditional knowledge structure, teaching mode and teaching thought cannot adapt to the development of form. The main problems are the dogmatization and simplification of the classroom and standards are static and patterned. At present, in China's universities and even the whole education system, the evaluation system with exam-oriented education as the basic feature is final evaluation. The typical "one examination for life" system cannot reflect the real development process of students, but also can not reflect the objective judgment of individual character. Such evaluation standards not only cover a number of academic personified talents, but also lead to the misunderstanding of

stereotype and tool in the cultivation of students to a considerable extent.

IV. Take the Opportunity of New Engineering Construction to Promote the Reform and Construction of Computer Majors

As a huge engineering major, computer science has cultivated a large number of talents for the society, and the graduates are widely sought after by the society, making great contributions to the development of national economy. But as the world changing, industrial development of the reform of the constitution and quality of new talent requirements, how to focus on the development of new demand, adapt to the development of modern industry and cultivate more high-quality computer class specialized talented person is a key to the road of reform and development of computer science.

A. How does the computer education change under the new concept?

1) New engineering stresses more on actively responding to changes

To master the future demand and development direction of the country and the industry, project education should implement the new development concept of innovation, coordination, green, openness and sharing, and comprehensively innovate the engineering education concept. We should cultivate modern engineering talents with comprehensive humanistic quality and excellent engineering ability [5].

2) New engineering stresses more on actively shaping the world

The establishment of new education model for engineering should at least include: first, summarize the reform experience of China's engineering education and refer to the internationally successful education model in line with the national conditions to create a new talent cultivation model with Chinese characteristics and world level. Second, the knowledge, ability and professional quality required by the comprehensive international engineering professional certification are analyzed based on the development of science and technology, industry and society. Third, according to the demands of industry and modern engineer, determine the talent training objectives and graduation requirements, and formulate a systematic and integrated talent training plan and curriculum system.

B. Explore the new mode of training computer professionals

1) Inherit the traditional engineering foundation and promote the development of new engineering

Traditional engineering is an important foundation for constructing new engineering. Although new engineering is an engineering form corresponding to the new strategic planning, the construction of new engineering is not to deny the traditional engineering. On the contrary, new engineering construction is inseparable from traditional engineering. Traditional engineering is the forerunner of new engineering, which provides important foundation for the construction of new engineering. The computer major includes the support of the basic science of mathematics, physics and so on, most

universities' computer development predecessor all comes from the mathematics and so on some computational statistics discipline, the computer development from beginning to end cannot leave the support of the science.

2) Promote interdisciplinary integration

"Interdisciplinary science is a very promising, very broad and important area of science," Qian Xuesen said. "It may not be understood at first, or it may be frowned upon, but it will eventually flourish." Under the background of new engineering, there is no doubt about the importance of interdisciplinary integration, which has far-reaching significance for scientific progress, knowledge inheritance and talent cultivation.

First of all, paying attention to the development of humanities is the foundation to promote the interdisciplinary integration. At present, some institutions of higher learning in our country there is still a heavy shift phenomenon, investigate its reason, misunderstanding, people tend to think that science and technology can directly solve practical problems, the humanities courses and research have been the dominant position of university from the past obviously take a back seat, even the reasons for their survival needs to be explained and illustrated. The lack of emphasis on humanities weakens the foundation of interdisciplinary integration. The humanities can set up correct values for people in education, which is not only the basis for understanding the essence of new engineering education, but also the basis for cultivating engineering talents with "craftsman spirit".

Secondly, the cultivation of interdisciplinary talents is an important way to promote interdisciplinary, penetration and integration, as well as a realistic choice to cultivate high-quality and interdisciplinary talents. The computer specialty in Chinese universities includes 6 basic majors, and the specialty Settings are too detailed. Even if the curriculum barriers between different majors in the same computer class are too deep, which hinders the further development of the computer science. Therefore, it is necessary to take two paths to develop interdisciplinary computer science and to cultivate interdisciplinary computer talents. Professional internal adjustment course system, eliminate some unnecessary this professional course, learning other computer professional core courses, such as for software engineering students, can learn in this major core programming language, on the basis of increasing hardware course learning, learning hardware programming language. For the college crossing, for example, Tsinghua University broke the traditional college and professional barriers in 2017 and conducted enrollment and training in 16 categories. The major categories of enrollment lie in the implementation of the major categories of training, and its role in the training of new engineering professionals lies in: improving students' general knowledge education accomplishment, understanding the knowledge system of related majors, subject development and mutual connection; It can help students to find the most suitable professional direction by combining their own interests and specialties on the basis of fully understanding the major of new engineering, which is conducive to the individualized cultivation of students.

Finally, strengthening interdisciplinary projects and team building can improve the efficiency of cross-disciplinary research and is also an important strategy to promote cross-disciplinary integration.

3) We will strengthen the integration of industry, universities and research institutes and promote cooperation between universities, enterprises, governments, institutions and governments

Different from the traditional engineering specialty industry cooperation education, the new engineering specialty industry-university-research cooperation education should emphasize the representativeness of the cooperation object and the frontier of education content. First of all, we need to carry out in-depth exchanges and cooperation with some representative enterprises. These enterprises have new industrial development characteristics, which can meet the current needs of economic development and international talent requirements, so as to meet the requirements of new engineering specialty education. Secondly, coordinate and communicate with the local government of the university in introducing campus funds and enterprises, and the cooperation should be pioneering, promoting local employment and development, promoting healthy, sustainable and stable economic development, and strengthening the new advantages of talent cultivation in local universities, which is conducive to the cultivation of the ability and quality of new engineering professionals. Third, cooperation between research institutes related to the new industry should be strengthened, because these institutes have conducted in-depth research on the future development of the new industry and accumulated relevant information, which is exactly what is needed for the training of new engineering talents. In addition, qualified universities should be encouraged and supported to carry out international cooperation on the above three aspects.

C. Create new quality of computer talents with international competitiveness

1) Cultivate diversified computer talents

With the gradual progress of the construction of "new engineering" nowadays, the update of new education concept, the cultivation of international talents needs a batch of interdisciplinary talents with new vision, new height and new thinking, and the talent structure has undergone significant changes. The computer major should give play to its unique advantages; make great efforts to develop diversified training methods, pay attention to the cross-disciplinary and innovative awareness.

2) Take the initiative to adapt to the development trend in the age of entrepreneurship and innovation and improve the level of innovation in computer specialty

Innovation is the core of new engineering construction and the driving force for the sustainable development of today's country and even the world. If a country does not innovate, its development will be limited and it will not keep up with the direction of social development. Innovation is the attribute characteristic of new engineering. It is the value of new engineering. Innovation is the main driving force for leading and driving the industry and economic development, the guarantee for the industry and industry to develop and win the

market competition, and the core capability that the engineering science and technology backbone of the industry and industry must have. Innovation is the number one driver of development. For students majoring in computer science, the practice of computer science is strong and it is updated quickly. Compared with other subjects, it is more suitable to develop their personality and innovation ability in the learning process. Experimental and practical teaching plays an important role in the cultivation of talents in colleges and universities [6].

V. CONCLUSION

The cultivation of new engineering talents in local colleges is the trend of the times and the only way for the colleges to transform and develop, while meeting the needs of social development. To better serve the regional development and industrial transformation, the school has a new and relatively sane new project education concept is the core. Meanwhile, the school should face the current changes actively, and reform to the new education model step by step combining the needs of enterprise development and the situation of national development strategy. Engineering changes the world, science and technology creates the future, and engineering education determines the present and future of humanity. Therefore, emerging engineering education must place the training of innovative and outstanding engineering talents in a more prominent strategic position, strengthen the research on the laws of the new engineering construction, speed up the reform of Engineering Education in China with new concept, new requirements, new ways, which could provide intellectual support and talent guarantee for the realization of the "Chinese Dream" the complex world and the future.

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