Exploration and Research on the Cultivation of Computer Professionals Under the Background of New Engineering

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Abstract. In 2016, China became an official member of Washington Agreement, the mutual recognition agreement of international undergraduate engineering degree, and China's higher engineering education reform ushered in new challenges, while constructing new engineering disciplines is the main solving way. Based on the summary of the important significance of new engineering construction and the requirements of National Standards for Teaching Quality of Computer Majors, this paper carries out some useful explorations and researches on the training modes and training programs of computer professionals and the construction of teaching staff under the background of new engineering.

Introduction

In 2017, the Ministry of Education launched “New Engineering” development research work[1], and developed Fudan Consensus of “New Engineering” Construction [2] on February 18th, “New Engineering” Action Line (Tianjin University Action) [3] on April 8th, and Beijing Guide [4] on June 9. The leaders of the Higher Education Department of the Ministry of Education have repeatedly stressed that it is necessary to focus on the national development strategy, grasp the new situation and tasks of talent training in colleges and universities, comprehensively deepen the reform of higher engineering education, accelerate the construction of new engineering and actively face the future to adapt to and lead the new economy. New engineering construction has set off a new wave of reforms in China’s higher education sector [5], and various universities follow the lead actively, which causes great repercussions in industrial circles and the world.

The new economy and new industries are the background of new engineering [6], and China must develop a number of new engineering majors while promoting the continuous reform and innovation of the current engineering professions. As computers and related industries are indispensable parts of the future social development, in order to cultivate more computer professionals in the context of new engineering, this paper explores the significance of building new engineering and carries out a comprehensive study on the training and educational measures of computer professionals under the background of new engineering.

The Significance of Constructing New Engineering

Since the emergence of the new engineering disciplines in 2016, it has been intensively explored by major universities as a key project in a short period of time. The emergence of new engineering is a symbol of continuous innovation in science and technology and continuous improvement of industrial development. And it is also a new thinking for the future development of engineering education in China [7].

New Engineering Construction is the Need of Serving the New Demands of National Strategic Development

For engineering education to innovate, it is necessary to start from the perspective of national demand. The aspects of achieving the development goals of “two hundred years” in the future,
promoting the rapid and sound development of society, forming a green shared development concept in the society, and promoting the transformation of large and small enterprises in China into service industries require the continuous reform and innovation of higher engineering education, to form a new development economy of new products and new technologies and fully complete its tasks in talent education and scientific research, thereby continuing to carry forward and promote China’s excellent traditional culture.

New Engineering Construction is the Need of Building New Advantages in International Competition

In order to win the top in the fierce international competition, the most fundamental thing is to increase the intensity of personnel training. In the future, the aging of the population, energy shortage and climate change will pose a great threat to the environment in which people live, and will also seriously hinder the strategic pace of China’s sustainable development. Under the background of the accelerating globalization trend, a new round of scientific and technological revolution and industry are constantly emerging. As a result, the interdisciplinary integration and development become faster, and the emergence of new disciplines and continuous development of various innovative technologies greatly promote the transformation and development of emerging industries.

In today’s people’s lives, the most commonly seen virtual reality technology, cyberspace technology and robotic systems change people’s thinking. At the same time, they are also the core parts of talent cultivation, promoting the continuous innovation in engineering education, cultivating more professional talents for the society, and urging China to win the initiative in international competition.[8]

New Engineering Construction is the Need of Implementing the New Requirements of Enhancing Morality and Cultivating Talents

With the continuous advancement of quality education reform, the main goal of education now is to cultivate talents with lofty character. Enhancing morality and cultivating talents are taken as the educational policy, and the socialist values are taken as the core in the whole process of education, to cultivate professional talents with correct values and high quality.

Exploration on the Training Modes of Computer Professionals under the Background of New Engineering

Carefully Designing Teaching Links and Highlighting Talent Training Objectives

Based on the new engineering background, in order to better carry out the training of computer professionals, the education process of major universities can proceed from the aspects of professional quality education and technical ability improvement.[9] First, help students plan their careers in advance. In the first three years of college education, the content related to professional quality can be set in each semester, to enable students to correctly evaluate themselves and then plan their future development direction. Meanwhile, it is necessary to form the concept of lifelong learning. Only in this way, on the basis of continuous development and progress of the times, can computer professionals also keep pace with the times and not be eliminated by the society. Second, carry out construction of corporate culture campuses in colleges and universities. Well-known enterprises in the society can be invited to come to the school for conducting training and carrying out in-depth exchanges with computer professionals, to let them know more about the development and needs of industry positions in the society, encourage them to have a comprehensive understanding of the computer industries and enterprises, and help them better develop career planning content. Third, actively encourage students to go to well-known computer companies for internships, especially representative enterprises in the society, such as ZTE Corporation. The field observing and studying can not only stimulate students’ enthusiasm for the work, but also promote them to improve their own deficiencies.[10]
Innovating Teaching Methods and Building Efficient and High-quality Classrooms

In the context of new engineering, in order to promote the continuous improvement of actual teaching effects, MIMPS project teaching method can be used in the training process of computer professionals.[11] The biggest advantage of this teaching method is that it can conduct better education for professional curriculum while helping a lot in the teaching of students’ professional courses.

For example, in the teaching process of the basic course of computer majors, Computer Network, conducting education based on the MIMPS project teaching method can not only promote students to better understand and learn theoretical knowledge, but also can be combined with practical education activities, laying a solid foundation for the continuous improvement of the teaching effect of computer majors. In the process of professional course education, teachers can flexibly use the MIMPS project teaching method, which can fully exert the teaching ability of teachers and help teachers accumulate more teaching experience.

In order to better apply the MIMPS project teaching method into the education and training process of computer professionals, first of all, it is necessary to carry out task assignment teaching for students from the practical job responsibilities of the computer industry. Secondly, in the process of students actually participating in practical activities, adhering to the principle of hierarchy, the activities should be carried out from simple aspects to difficult aspects, to promote the integration of the theories in practical education curriculum with practical activities. Lastly, change the traditional teaching mode, focus on the form of group cooperation, and guide students to accurately evaluate themselves and make objective evaluations of others at the same time, to promote the deepening communication and increasingly harmonious relationship among students. In short, a series of measures can be applied to create a relaxed environment for the education and cultivation process of students majoring in computer, hoping that students can learn in happiness and promoting the teaching efficiency.

Building a First-class Engineering Practice Platform and Constructing a New Practical Teaching System

The leaders of major universities can make full use of the advantages of social enterprise resources, cooperate with them, establish a practice base related to the computer industries in the school, and promote the digitalization of teaching resources, the actualization of teaching content and the platform transformation of teaching methods. In order to achieve this, firstly, the educational platform of network simulation can be applied to improve the limitations of the practical conditions in school, so that the students’ practical activities can be conducted on the basis of various technologies and innovations, which can promote the constant improving of students’ practical ability as well as the constant broadening of students’ thinking. Secondly, it is necessary to cooperate with well-known computer companies to build a campus internship platform, to enhance students’ professionalism while effectively improving their professional skills. Finally, with the help of many current industry incubators, high-quality professional computer talents that meet the needs of social posts can be cultivated.

Strengthening Case Teaching and Improving Students’ Project Practice Ability

In the current education process of computer professional curriculum, case-based teaching method is commonly used. In the process of actual training and education, practical business cases related to computer can be introduced and tasks can be set for students, to guide students to complete tasks independently. This measure helps students better understand the content of textbooks and improve practical ability.

Integrating Academic and Engineering Talents and Creating a Team of Mixed Teachers

In order to train more professional computer talents, when selecting teachers, major universities must choose teachers with high level, high academic qualification and rich experience to carry out teaching activities.
For example, ZTE chooses a group of engineers with rich practical experience to teach students. First, several engineers can be selected to teach students’ professional courses and guide students’ professional internships and thesis writing. As the number of students continues to increase, so does the number of engineers. Secondly, colleges and universities can assign computer professional teachers at school to participate in education and training at social positions regularly, so that the professional competence of teachers can be continuously improved. In general, in order to cultivate professional computer talents, it is necessary to promote double-level education of post-related engineers in the society and teachers in the school. Therefore, students can learn basic theoretical knowledge at school, and at the same time, have clear career direction and continuously improve practical ability through the experience of engineers.

Innovating Cooperative Education System and Mechanism and Building School-enterprise Integrated Teaching Management Platform

In the process of engineering education, the integration of industry and university is an important way that cannot be ignored, and also a way valued by major universities. The aim of the cooperation between schools and enterprises is to build resource sharing for the student’s learning environment, and talent training model established on the basis of schools and enterprises can better adapt to the future development of computer industry. In order to better promote the cooperation between schools and enterprises and better carry out teaching work, first of all, the continuous optimization of teaching resources should be promoted, to better manage the various things in the school. Secondly, based on the foundation of schools and enterprises, in order to establish a complete teaching system, a “double-subject” operation system based on engineering practice can be established. Finally, it is necessary to develop industry-related evaluation systems, continuously innovate teaching evaluation methods, and establish a sound continuously-improving system.

Study on the Formulation of Training Program for Computer Professions and the Construction of Teaching Staff

Formulation of Training Program for Computer Professionals

In the process of talent cultivation in colleges and universities, scientific and rational training program is a necessity. The program is used as the guidance for training professionals, to promote the continuous improvement of the quality of teaching content and teaching activities. In order to promote the stability of professional talent training programs, universities in China must carry out comprehensive program rectification and improvement regularly, in order to promote the continuous improvement of personnel quality in the process of cultivating professional talents, to better adapt to the needs of social development.

What needs special attention here is that the professional talent training program is not only conducted for the content of college textbooks, but also conducted from the overall situation, combining the needs of the society and enterprises for talents, to cultivate the professionals required in social development. In order to cultivate computer professionals, the first step is to invite relevant experts in this field to conduct research, especially the graduated students who have high influence in the industry or have made significant contributions. Based on their practical experience, and after fully understanding the requirements of the society for computer professionals, the training programs can then be developed. A few of them think that people in the industry may not understand the teaching model and the content of teaching materials, and their suggestions may not accord to the actual educational process. In fact, most graduated students do not really understand the importance of course for them until they have a job, so that they attach more importance to the content of textbooks.

Construction of Computer Teaching Staff

To cultivate professional computer talents, the construction of teaching staff is an important aspect that cannot be ignored. The education departments and other relevant departments in China
propose that the overall quality of the teachers should be continuously improved, and a team of teachers with strong beliefs and high professional ethics should be built. With the continuous deepening of quality education reform, the demands of colleges and universities for teachers are increasing, for they require teachers to have doctoral degree or overseas study experience. Although it seems a good thing to raise the threshold of teachers, there are also disadvantages for engineering.

The most obvious disadvantage is that most of the teachers with doctoral degree have a strong theoretical foundation, but they neglect the relevant research on social development. If they undertake teaching work, it will inevitably lead to insufficient management of students’ practical ability and also lead to students’ incapability of solving complex engineering problems.

Based on this, in the current computer professional teachers team, it is necessary to establish relevant system evaluation systems to promote the development of new engineering disciplines. On the one hand, the evaluation criteria for teachers’ abilities and teaching levels are classified, and especially for new engineering majors, complete discipline classification should be set up. On the other hand, in order to make the new engineering team more powerful, more professional doctoral teachers can be recruited. Only professional doctors who have a better understanding of the computer industry would have an in-depth understanding of this aspect, to lay a solid foundation for cultivating more outstanding computer professionals under the background of new engineering.

China had educational majors related to master of engineering not long ago, but in fact students are not interested in the majors. The biggest reason is that no one knows what the future employment situation of the education majors is. With the continuous developments and changes of the times, the number of applicants for majors corresponding to new engineering has increased.[12] As a result, the team of computer professionals under the background of new engineering develops and changes with the situation and would inevitably present a prosperous situation.

Summary
In short, based on the historical background of new engineering, all major universities and all walks of life in China have paid more and more attention to the training and education of computer professionals. However, there is still a certain gap between the current situation and the requirements of the National Standards for Teaching Quality of Computer Majors. Therefore, in the process of cultivating computer professionals in China in the future, it is necessary to adopt a series of measures to promote the continuous improvement of the level of computer professionals training, and to promote the all-round development of computer professionals, laying a solid foundation for the fast and prosperous development of Chinese economy.

References


