Building the Applied Curriculum System in Computer Major for New Engineering Construction

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Abstract. Strengthening the training of new engineering talents is an important task for colleges and universities to further enhance higher engineering education and engineering talents development. Facing the training of new engineering talents, this article focused on the general ideas and specific methods of constructing applied curriculum system in computer major.

Introduction

Since entering the 21st century, in the face of new economic development and a new round of scientific and technological revolutions and industrial revolutions, focusing on the needs of building innovative and new industrialized country, it is necessary for our country to cultivate new engineering talents with high engineering competencies in engineering practice, innovation, and international competitiveness in the field of future emerging industries and new economic development.

Problems Existing in Computer Talent Training

The computer professional knowledge is updated quickly, and it is highly interdisciplinary with other disciplines. New technologies such as mobile Internet, cloud computing, big data, the Internet of Things, and artificial intelligence are all closely related to computer science and computer technology. Computer professionals have become the main force leading the future of new technologies, cross-disciplinary integration and cross-border integration. Therefore, it is necessary to strengthen the training of computer professionals from the perspective of strengthening talent guarantee and intellectual support in combination with national innovation development strategies and the development needs of new technologies, new economies, and new industries.

Compared with the state's cultivation requirements for new engineering talents, the current talent training model and quality of computer majors have a large gap in all aspects. For example, the orientation of talent training is not clear enough, it is not closely integrated with the new needs of national industrial development and transformation and innovation-driven development, and it is not closely integrated with the development of new technologies, new industries and new economies. The students’ knowledge and ability structure cannot meet the competence and quality requirements of composite engineering technical talents, the educational concept is still biased towards the traditional education model based on knowledge input, fails to fully introduce international advanced engineering education concepts, and fails to highlight engineering practice and creativity of students.

The teaching content is outdated, and does not fully reflect the latest direction and trend of the development of computer technology, and is far from the actual needs of industry companies. At the same time, it fails to strengthen the composite knowledge and ability structure; it still uses a more traditional talent training model and fails to fully introduce industry companies to participate in talent training.

In terms of training quality and training specifications, the computer talents currently relying on the traditional talent training model can no longer meet the national innovative development strategy and the development needs of new technologies, new economies and new industries. Computer professionals, as the main force to lead the future of new technologies, cross-disciplinary integration
and cross-border integration, need to improve the quality and specifications of talent training around new ideas, new structures, new models, new quality and new systems for new engineering construction. It is necessary to carry out in-depth exploration and research on the cultivation of new engineering talents in computer major, focusing on cultivating new-type engineering and technical talents with strong engineering practical and innovation ability, and with complex knowledge and ability structure.

**Constructing the Applied Curriculum System Suitable for the Training of New Engineering Talents in Computer Major**

Focusing on the complex knowledge and ability structure requirements of new engineering talents, focusing on the cultivation of engineering practical ability and innovation ability, taking real projects as the main line, through reforming teaching content and teaching methods, relying on the multidisciplinary advantages of comprehensive university and relying on collaboration educational platform, we should build the applied curriculum system that is able to highlight the training of engineering practical and innovative ability.

**Updating Knowledge System and Teaching Content**

We should reform the traditional teaching content of computer major, so that the teaching content is able to meet the current and future technical development needs, and meet the multi-dimensional and complex knowledge and ability structure needs of the new engineering talents in the specialty.

1. Combined with the latest industry and professional needs, we should strengthen research and demonstration, determine the technical points, technical directions and professional knowledge involved in the development of software and hardware products in the technical field, and lay a solid foundation for targeted improvement and updating of teaching content. We should re-identify and clarify the corresponding relationship between skill points, application abilities and teaching content required for product or project design; determine the corresponding relationship between knowledge points, knowledge structure and curriculum teaching content and objectives required for product or project development.

2. We should reform the content settings used in the traditional teaching process. The teaching content should reflect the latest development trends and cutting-edge technologies in the fields of computer technology. We should delete teaching content that is too outdated or out of touch with current computer technology development, and focus on adding teaching content that is able to reflect cutting-edge development or the latest computer development and application technology.

3. Combining the three main lines of "problem solving," "system platform" and "data science" in computer major, we should add relevant teaching content that can reflect the core application points of the major and help cultivate engineering practical and innovation ability, especially with practical solutions techniques and methods related to engineering application issues.

4. The corresponding teaching content should be added according to the multi-dimensional compound knowledge and ability structure requirements of new engineering talents in computer major.

5. Based on real projects, we should highlight the content setting of practical links. The emphasis should be placed on the practical links that can highlight the core application points of the specialty and help cultivating engineering practical and innovation capabilities.

**Building the Applied Curriculum System**

In the construction of the curriculum system, on the one hand, we should build the applied curriculum system based on real projects, focusing on the cultivation of engineering practical ability and innovation ability, focusing on the ability of new engineering talents to solve complex engineering problems, and on the core problems of "problem solving," "system platform" and "data science" in computer major. On the other hand, the comprehensive quality of new computer
engineering talents should be improved relying on the multi-disciplinary education system and platform of comprehensive university. We should provide a curriculum system capable of cultivating composite knowledge and ability structure through cross-disciplinary integration and breaking the barriers between disciplines and specialties, which is able to give full play to the multi-disciplinary advantages of comprehensive university.

The construction of the applied curriculum system for the training of new engineering talents in computer major needs to combine the three target levels of application ability training, follow the CDIO engineering education concept, and be driven by work tasks and real projects.

(1) It is necessary to carry out the construction of applied courses with the two main lines of engineering practical ability, innovation ability training and real projects. Faced with the needs of industrial innovation, cross-border integration, and vocational positions brought by the development of new-generation information technology, combined with the new professional direction and new professional fields of computer major, we should systematically combed the knowledge points of all professional courses and focus on the content of professional courses or the corresponding relationship between the knowledge unit and the students' professional skills, application ability, engineering practical ability and innovative thinking training system. In the course of course implementation, the focus is on this kind of correspondence to realize the actual implementation of the comprehensive knowledge and ability structure training of new engineering talents at the practical level.

(2) It needs to focus on the solution of complex engineering problems and rely on the school-enterprise cooperation and collaborative education mechanism and platform to build the applied curriculum system in computer major. Oriented to the industry, advanced technology, and core job requirements, combined with the typical work tasks, fields of action and subject areas of new engineering talents in computer major, core curriculum groups should be built that connect vocational positions around the solution of complex engineering problems. Through a series of successive applied courses, students' ability to analyze and solve complex engineering problems would be fully cultivated.

Following the international CDIO engineering education concept, the design concept of the applied curriculum system based on the working process, combining the curriculum content and the correspondence between the curriculum system and the application ability and engineering practical ability training system, in accordance with the laws of engineering education and engineering logic, we are able to develop the construction of the learning result-oriented curriculum system. At the same time, relying on the school-enterprise cooperation and collaborative education mechanism and platform, we have established the applied curriculum system suitable for the cultivation of new engineering talents in computer major.

Building the High-quality Double-qualified Teacher Group

In order to improve the training quality of new engineering talents, the teachers should not only have a high theoretical level and teaching ability, but also have an industry background and strong practical and application ability in the industry, that is, they should have a "double teacher" quality. A high-quality double-qualified teacher group is an important part of building the training system for new engineering talents.

On the one hand, we can hire outstanding professional or high-skilled talents of related enterprises as part-time teachers in the enterprise's technical courses or practical training courses. On the other hand, we can also combine the university's plan of teacher strength development and teacher capacity development to encourage teachers to regularly participate in training, continuing internships, on-the-job training or directly participate in corporate research and development projects in enterprises to enhance teachers' ability to improve their own practice and application enthusiasm and initiative, increase the proportion of double-qualified teachers in the teaching group, and continuously improve the ability and level of teachers to conduct applied research and guide students to apply practice.
Conclusion

The construction of new engineering disciplines represents the latest development trends and requirements of China's higher engineering education reform. Constructing the applied curriculum system for the cultivation of new engineering talents is conducive to the establishment of the training system for new engineering talents with its own characteristics of computer major, and also is conducive to the overall improvement of the quality of talents training.

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