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Cultivation Mode of Computer Technology Specialty Based on the Cooperation of University and Enterprise

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Abstract. In this paper, the situation of domestic graduate student education was discussed firstly. It gave the specific cultivation mode of computer engineering postgraduates based on the cooperation of university and enterprise under actual projects. It explored the new approach and strategy on the innovative talent training in the engineering postgraduates so as to adapt to the request of enterprises and new technology trends.

Introduction

Currently, the main training goal is to develop a solid knowledge base for information technology, and be able to the advanced information technology to solve the problem of enterprise and social practical engineering applied talents for our school master's degree in computer technology,. Therefore, in the teaching of postgraduate training and related courses, it is necessary to strengthen cooperation with enterprises. By using deep cooperation, it can be directed by school teacher and company mentor and depended on the enterprise engineering and application of actual project. Between the two sides it can be carried out joint training graduate students together. It is important to develop the research ability of graduate students and practical application of new technology. The aim of this project is to explore the cultivation of talents with innovative ability, mastery of research methods, and adapt to the latest technological development of information technology. The enterprise project cases related to the project can be used for postgraduate teaching and can effectively improve the teaching quality of postgraduate courses.

The Situation of Domestic Graduate Student Education

New Cognitive Mode of Computational Thinking

Computational thinking, figuratively speaking is *to think problem like a computer scientist*. Computational thinking is to use the basic concepts of computer science to solve problems, design system, and understanding of human behavior science methods [1]. Computational thinking is characterized by design and construction, a series of thinking activity covers the field of computer science, its core essence is abstract and automation is the world's most basic mode of thinking.

With the coming of the era of big data, computational thinking will be the same as mathematics, physics thinking, become one of the most basic human thinking way. For the cultivation of computational thinking ability will become the important part of computer teaching, especially the foundation teaching. To develop computational thinking ability as the core of computer basic teaching task, not only contains the fundamental task of computer basis teaching existing core knowledge and content, and reflect the nature of computer science, also reflect the characteristics of university foundation education should have, the more highlight the training of thinking method.

It easier to limited teaching hours to deal with the pressure of teaching reform and development of technology, not only get rid of the skills as the goal to cultivate the students' computer application ability of crisis, but has explained the basic computer teaching goal better.

Teaching Plan Setting

In our computer school, for example, the current graduate teaching basic '0.5 + 0.5 +2.0' mode, the curriculum is compressed to first year to complete. First two semesters, must be finished the all curriculum. Last two years, students in school or internship units finish their graduation design work and attend the rejoin of master degree.

This model is said to be in order to response to the call of the ministry of education, increase students' practice time. In terms of desire this kind of teaching plan is designed to train more applied talents, its original intention is good.

Based on the above analysis, we believe that university education now might be too value in *shape*, and to the *quality* of too little [2]. These need everyone to seriously reflect on and improve it.

The Syllabus and Teaching Content

In our school, for example, changes to the syllabus in still more attention. College teachers had written the various grade outlines of all courses including teaching outline and the experiment ones. But, from the management side, mainly in the examination of outline format and specification, the teaching content of the outline is not comprehensive and in-depth analysis, especially some related, as well as interdisciplinary courses outline content, as well as strict and extensive discussion and argument. In addition, due to the same subject (especially some compulsory course), often by many teachers as respectively, therefore, the outline of the doctrine of the mean are compared, the lack of personalized teaching arrangement. If the teacher completely according to the teaching outline, will lead to teaching content the same, and then will inevitably affect the students' interest in learning.

Teaching Methods and Means

At present, all classrooms equipped with multimedia teaching equipment and teaching conditions compared with a decade ago had the very big improvement. But the school's teaching space is still limited in the classroom or laboratory. In essence, no much difference with a decade ago. On the one hand, the teacher teaching is very hard, in addition to preparing and after-school tutoring, due to the content of the course syllabus, teachers' teaching task must be finished within the prescribed period, therefore, in the mode of teaching, basically is to give priority to teachers' lectures in classroom. This way led to the lack of interactive teaching between teachers and students. On the other hand, the students passively study way, make their learning potential was suppressed, main sources of knowledge from the teachers; it's not adapt to the social requirements for the cultivation of applied talents.

Teachers' Team

The current age structure of teachers in our school is shown as *dumbbell* shape, on the one hand, the teachers after 60s, assumes the teaching task of major courses, and most of them have rich experience in teaching, but also face the renewal of the knowledge structure and learning new technology challenges; in recent years, on the other hand, more new young teachers after the 1980. These young teachers, on the one hand, lack of experience in teaching, on the other hand also need to increase the scientific research ability, facing the double pressure about improving the teaching level and undertaking scientific research task.

Talent Localization

At present, the computer science and technology professional positioning is *thick foundation, value applications*, but what foundation thick? What applications pay attention to? These problems still need to further clarify. Our school is a Beijing municipal comprehensive university; the school is also to cultivate applied talents as the main goal. But, at present, the enterprise and society have a new

request for the need of applied talents, especially since the development of information technology, such as the Internet, in the field of information technology, the demand for Web application talents, such as "data engineer", or "data analyst" wait for a new career, and in the face of these applications, our talent localization need to do further adjustment, in teaching basic knowledge and application of technology should keep pace with the times and further clarify [3].

Exploration and Practice of the Cultivation Mode Based on the Cooperation of University and Enterprise

Adjustment of Teaching Plan and Course Content

The big data research is a kind of interdisciplinary research, so to restructure the existing computer courses or increase interdisciplinary courses becomes more important. Current computer education needs to increase interdisciplinary courses while strengthening basic courses education. Students wish to have interdisciplinary knowledge and learning ability of new technology. It is a challenge how to embody the characteristics of the cross subjects, and how to train the specialists in the field of big data [4]. Computer industry is evolved into real information industry, from the pursuit of computing speed to focus on big data processing ability; the software will also change from mainly programming to data-centric.

In the face of the current trend, computer educators should gradually increase data as the center of the teaching content and experimental design in the teaching process. Computer science is a practical strong discipline, and it is a key link for big data era of computer education, strengthening practice link, setting up big data teaching experimental environment in the process of computer professional talent training. Computer educators should carry out more course experiment, course design, extracurricular activities of science and technology practice, so as to expand the scope of practice, strengthen practice and try to reform practice mode.

Combination of Government, Enterprise, University, Institute and Employee

The teaching reform federation built by colleges and enterprises together, jointly determine the talents training target, course system, teaching content. School full-time teachers and enterprise share curriculum teaching. Students' practice and graduation design and other practice choose firstly in enterprises. In addition, universities and local government cooperation, through the high and new technology industrial park to build regional technology sharing service platform and the key laboratory, provide enterprises with high and new technology, high-end equipment services and personnel training service, create a government-industry-university-institute cooperation in enterprise cluster construction of key laboratory of new model, realize the win-win situation. For students, we can often organize students to visit enterprises, can use platform and business meeting, solve the problem of students' internship, employment, in order to cultivate the practical and engineering fundamentally interdisciplinary talents for enterprises. To the enterprises, technology platform for the construction of the direct support for enterprise innovation, provide equipment and technical advisory services for the enterprise, convenient for student internships and work. For teachers, many enterprises offer the platform for the industrial park construction, closer to the school teachers and enterprise technical personnel's distance, make the teacher's scientific research more close to the industry development needs. For the government, the use of public service platform of the technical advantages of colleges and universities improves the campus environment of technological innovation, enterprises to the park provides technology and talent service, improve the park attraction to the enterprise.

Cultivation Mode Based on Actual Project

Since the highly unified characteristics of professional degree of professional and academic, the dissertation topic of computer technology and engineering postgraduate student should be from the practical engineering. In the process of the cultivation of engineering postgraduates, on the one hand,

it should avoid simply to set the tendency of all engineering graduate student training process by the specific application project development; On the other hand, engineering postgraduate student (especially full-time master of engineering postgraduate students) training should pay special attention to the principle of combining theory with practice, by relying on the guidance teacher's research topics for dissertation topics, should pay attention to the systematic and normative training of project development process so that to ensure the integrity of engineering postgraduate students' practical skills and practice ability.

In the practice of cultivating engineering master graduate student, the implementation based on actual development project will face two basic problems, namely how to form suitable project for training of engineering postgraduate student and how to ensure the implementation effect of the actual development. To this end, the actual development projects were divided into two categories: from the actual development of the enterprise technical problems subject and from university teachers undertake the actual development of the subject research and development projects, each type of actual development project using different formations and guarantee mechanism.

In fact, the enterprises have many technical problems need to study and solve, but their lack of technical strength, externally commissioned and faces many uncertain factors. It is an effective way for solving technical problems by the joint training of universities and enterprises for postgraduate students. Particular way is, by the enterprise according to the long-term technology development plan, put forward technical requirements, set some technical problems in the form of project into several research topics. Jointly organized by the universities and enterprises, for each subject to arrange several part-time engineering graduate student from this enterprise, as well as full-time master of engineering graduate students from the universities and engineering master's research to join them, the key job of engineering masters are to solve the theory problems, engineering postgraduate students of full-time system and non-full-time system the key to solve the technical problems and engineering problems. Non-full-time master of engineering postgraduates by completing a practical project, rich their theory knowledge, strengthen their professional skills, and ability to solve actual problems; Full-time master of engineering graduates by completing a practical project, consolidating theory knowledge, be familiar with the actual engineering and exercise practice ability; Engineering master students by completing a practical project, meet the actual project, enhance the ability of theory with practice.

There are also many technical problems need to be solved when universities and colleges teachers undertake significant research projects and application development projects. These problems should be the solution through the whole process of the cultivation of engineering postgraduates so that to ensure the quality of the cultivation of engineering postgraduates. Thus it puts forward how to standardize the knowledge system and ability structure, how to form the common practice of supporting system, how to close to the needs of the enterprises, how to cultivate the engineering development ability and so on. Through summarizing the practical practices for many years, there are two kinds of measures to solve these problems: one is to establish various forms of training bases, provide a variety of hardware and software support environment and organization management system for engineering development and application technology development requirements; another is to invite the computer companies to participate in the cultivation organization of postgraduates, with the support of computer enterprises' management practices, with reference to corresponding computer enterprises' development specification, to carry out the implementation, management and evaluation of the whole process of talents cultivation.

Summary

The cultivation of the computer technology and engineering students should implement from the social needs, strengthen vocational guidance, in close connection with the development of computer science talent demands and the new technology trends, to make innovation training mode, to highlight the characteristics of computer industry and the characteristics of cultivate unit itself. At present, our

university is to plan as a whole to promote *five environments* (i.e. space, education, education, governance, and emotional) construction, to promote the school again [5]. Local colleges and universities to make an impact in the construction of *double top*, must be based on the existing basis, develop the confidence, seize opportunities, grasped the nettle and take root place, facing the world, focus on strengthening the connotation construction, efforts to achieve the key breakthrough, characteristic development [6].

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