Research and Exploration of Training Model of Practical Ability for Full-time Master of Engineering in Computer Technology

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Abstract. For the training of practical ability for full-time Master of Engineering in computer technology, several problems are discussed, such as the unreasonable training plan, the teaching theory with unbalanced attention, the practice segment which cannot meet the professional requirements and the unclear practical requirements of the graduation thesis. Corresponding solutions are also put forward, including that detail the training plan, increase practice hour; standardize teaching segment, raise the proportion of practice teaching, standardize practice segment, establish off-campus practice base with high quality, and formulate the assessment standards of practice part in the graduation thesis design, and so on. Various measures to improve the training of practice ability for full-time Master of Engineering in computer technology are mentioned.

Introduction

With the arrival of knowledge economy, countries gradually pay attention to the cultivation of top talents, so that graduate education is particularly important. However, with the transformation of national industrial structure, the demand for the applied top-talented technical management personnel increases gradually, and the existing academic graduate students is not very good to satisfy this requirement. In order to produce applied high-level personnel which meet the demand of economic development, Department of Higher Education in all countries all over the world reforms accordingly to adapt to the transformation of change. In 2009, Chinese Ministry of Education has begun to implement training for full-time Master of Engineering across the country. The education of Engineering Postgraduates, which aims to cultivate applied top-talented engineering personnel, who master certain professional basic theory and wide professional knowledge, strong ability to solve practical problems, ability to undertake professional or managerial work independently, good professional quality, is associated with professional degree graduate education who relates with engineering qualifications [1, 2].

According to the above guidelines, training target of full-time M.Eng in computer technology can be that postgraduates should master the basic theory, advanced technology, method and means in computer technology, and be engaged in engineering design, and implementation, research, development, management of project in a certain direction. At the present stage of development of professional degree graduate education has become an important measure to enhance the graduate students adapt to economic and social development and employment abilities, professional degree and academic degree is at the same level, but the training specifications are different, there are significant differences in training objectives. Professional degree is oriented by professional practice, emphasizing practice and application. It is a high-level talents who are trained in professional and
specialized skills. The prominent feature of professional degree education is the close combination of academic and professional. Among them, the key is the practical-ability training [3-6].

However, with insufficient implementation time and experience, the problems gradually emerge. In view of analysis on existing situation, corresponding measures are proposed in this article.

**Existing Problems in Training of Full-time Master of Engineering in Computer Technology**

**Unreasonable Training Schemes**
Training scheme of full-time Master of Engineering in computer technology at present is designed according to the solo professional field of "computer technology". However, the requirements of teaching and practice in different directions are quite different. At present, there is still no refinement in the professional field direction. So, the same training target and scheme for different directions is vague, lacking targeted guidance.

In addition, there is no practice in the cultivation scheme. Computer technology field has strong professional requirements to the practice ability. Therefore, training scheme need put forward the practice segment to cultivate the students' practical ability and enhance their work adaptability.

**Less Attention to Theory Instead of Practice in Teaching**
First of all, the teaching contents are not aimed at the full-time Master of Engineering. Teaching content of courses is referenced to that of engineering graduate and undergraduate, who emphasizes on theoretical knowledge, ignores the application and practice. Secondly, the teaching course is basically done by teachers in the classroom. Third, curriculum evaluation cannot reflect the specifications and requirements of engineering master's cultivation. At present, the evaluation of curriculum has two forms: test and course work. And these two fails to test the practical ability.

**Unreached Professional Requirements of Practice**
Practice is mainly in the form of curriculum design, graduation practice, etc. Teachers cannot make deep excavation of curriculum content in view of onerous task in teaching and scientific research. Hence, curriculum design content is relatively simple. And graduation practice is contacted separately by students. Therefore, it is difficult to guarantee the quality of practice. As a result, practice link will not be able to meet the professional requirements, student’s professional skills and project experience in practice cannot be increased significantly.

**Unclear Practical Requirements of the Graduation Thesis**
There is no clear practical requirement for graduation thesis of engineering master. This makes students have insufficient understanding of the importance graduation practice, so as to reduce the proportion of practicality in the graduation design, even give up practice. And because of the fuzzy practical requirement of graduation thesis, combined with various styles of guiding teachers, there is no guarantee that engineering graduates pay much attention to practice.

**Training Mode of Practical Ability of Full-time Master of Engineering in Computer Technology**

**Detail Training Plan, Add Practice**
For full-time Master of Engineering in computer technology, detail training scheme into specific direction, including design and development technology of computer software system, design and development technology of computer software hardware system, development technology of computer application system, processing of information and signal and so on.

On this basis, adjust the curriculum system setting to accord with the training target. The curriculum should closely integrate with the engineering practice, and the course content should be
different with the master’s degrees. Several following aspects should to be done: First, the curriculum content should be integrated. The current computer technology full-time Master of engineering using Master of Engineering Teaching materials, compared to the Master of Engineering pay more attention to the theoretical aspects of the introduction. The Master of Computer Technology Engineering needs more knowledge than Master of Engineering, should be involved in research, development, production, marketing and many other areas of knowledge. Therefore, it is necessary to establish a new curriculum of computer technology engineering technology. Second, the course content increases practical knowledge and engineering practice experience. Through the questionnaire, the current teachers and students generally believe that the practicability of the course is not strong, teachers and students generally hope that the current computer technology Master of Engineering Teaching content can increase engineering practice experience. Third, the curriculum should refer to the needs of enterprises. The curriculum should be fully investigated, visited and investigated by the enterprise, and agreed with the experts in the school as the basic course arrangement for the Master of Computer Technology Engineering. Fourth, we should pay attention to the opening of management courses. Through questionnaire survey, it is found that full-time Master of engineering and tutors have strong requirements for learning management courses, and management ability is considered as a very important ability by engineering masters and tutors. Fifth, in the course content and curriculum system reform, for basic courses, mainly emphasizes the basic knowledge and ability of theory, at the same time try to highlight its engineering application value and potential. But in the setting of specialized basic courses and specialized courses, especially for professional elective course setting, based on computer technology and industry trends in cutting-edge ideas, curriculum and international frontier, trying to demonstrate new technologies, new applications and new directions of computer technology in the field of engineering, and strive to reflect the latest changes in computer education, emphasis on principle, methods, ideas, trends and other aspects of learning and mastery of teaching content, eliminate the serious lag in discipline development phenomenon. Seventh, strengthen the cultivation of professional quality, set up "computer literacy” course, the main form of entrepreneurs’ lectures, reading reports, seminars, lectures and other topics. Train students to have the communication skills and ability to carry out team work; have a strong sense of social responsibility and ethical responsibility for the future career; have the ability to flexibly adapt to the future technological development. The topic discusses the computer technology in all aspects of social application, including computer community, technical risk, professional ethics, information economy, intellectual property rights and privacy protection, etc.. Through learning and discussion, students can become more aware of the value and responsibility of their future career. Lectures on special teaching method of computer communication professional, help students form for different levels of text objects in computer science and language communication skills, including how to explain the technical definition, system architecture, how to explain the process, how to record, and writing technical reports.

Professional degree graduate practice field of computer technology is mainly composed of practical courses and the teaching practice base of learning two parts of graduate students, encourage graduate internship, the practice and practice of piecewise combination. It is necessary for engineering graduate students to ensure that the practice teaching is not less than half a year, and the practice teaching time of the graduating undergraduates is not less than 1 years in principle.

Practice in the course of learning school is mainly composed of two parts: one is to strengthen the practice of classroom teaching, in the teaching of theoretical knowledge, in order to enable students to better grasp the knowledge points, each course will strengthen the practice teaching. But its practical teaching goal is to serve the curriculum, and each course is self-contained and relatively independent; two, it is to establish a computer technology practice teaching link which is independent of the classroom teaching. In the course of strengthening the practice teaching, the computer technology engineering practice training was carried out simultaneously.

Out of school practice refers to the practice of professional degree graduate students, whose teaching is mainly completed in the practice base of professional degree graduate students.
Practice base based on professional laboratory construction as a priority, the construction of basic experimental platform, giving play to the discipline advantage, construction of computer experimental teaching system, to adapt to the professional degree of computer technology training needs talents, optimize the allocation and sharing of resources, improve the investment benefit of laboratory construction.

Actively with the enterprises to build computer technology, software engineering research and development center, enterprise technology center, engineering technology (Research) center and Engineering Laboratory, vigorously carry out the research on the key technology of the computer, to enhance knowledge and technology innovation level.

To strengthen the joint and outside the well-known IT companies, promoting the combination of research, with the practice base of computer technology engineering master stable students, make the students earlier in engineering practice and innovation, to meet the requirements of the number of students.

Standardize Teaching Links, Raise Proportion of Practice Teaching

In terms of teaching content, on the basis of training goal, plan scientifically the teaching content of professional course, change the syllabus, raise the proportion of experimental links, making the teaching content include basic theoretical knowledge and engineering application. In the process of cultivation of full-time Master of Engineering, in addition to improving the curriculum setting, more attention should be paid to the teaching method improvement.

Finally, in view of the curriculum evaluation, examine the experimental course separately and independently, assess their theoretical knowledge and practical ability.

Normalize Practice, Establish Off-campus Practice Bases with High Quality

For specific courses, supervision on curriculum design can increase the application value and level of the course design; form a series of teaching practice project with a certain practical significance. For graduation practice, appraise the practice environment, learning environment and training mechanism of enterprise outside, sign a contract with the qualified enterprises, to form a long-term, stable and normative of off-campus practice bases. Set training scheme school and assessment index to regulate the quality of practice.

For selection of enterprises of engineering practice, practice platform instead of enterprises should be only focused. Students can choose internship place according to their own interest or research direction or their own development needs. Therefore, small and medium-sized enterprises can also be taken into account.

University-enterprise cooperation is to an effective way to develop full-time Master of Engineering in computer technology, which has accumulated certain experience in the process of engineering talents cultivation in our country. In this cultivation model, enterprises and universities exchange talents to train. Universities and enterprises jointly work out teaching plans, and enterprises fully participate in the whole process of talent training. Enterprises with advanced technology will be established off-campus practice bases, which provide students with the real engineering practice environment for the training of students' professional ethics and team cooperation spirit. For targeted-training Master of Engineering lack of practical experience, internship period should be at least not less than six months or one year. Hence, universities directly can establish off-campus practice bases and build talent training bases in the enterprises, which can be a method to more satisfy the full-time Master of Engineering in computer technology of with training needs.

Constitute Evaluation Criteria of Practice in Graduation Thesis Design

In the United States, requirements for the essays of Master of Engineering are different between universities. Dissertation is not required in University of California, but dispensable in Dartmouth College. In addition, in the Massachusetts Institute of Technology, George Washington University, Columbia University, and Stanford and so on, practical items can replace the paper as long as students
make achievements in scientific research. But, Master of Engineering must take part in a comprehensive level test after finishing all the courses, which is an important basis of degree-granting. This test has two parts, written examination and ability test. The former examines students in professional knowledge in the field of engineering; the latter mainly assigns students to accomplish project design or product development to test their operational capacity.

If we insist on granting students’ degree of full-time Master of Engineering in computer technology only when they accomplish design and writing of the graduation thesis, and make open reply, assessment standards of practical part in the design of master's thesis shall be constituted according to specific research directions in the field of computer technology. For instance, code quantity can be appraised in major of Design of Computer Software System. Furthermore, functional modules and progressiveness of technology can also be considered. Thus, it makes every direction in the same major own characteristic appraisal standards. Graduates of Master of Engineering will pay much more attention on practice only if the fuzziness of practice requirements for graduation thesis is eliminated.

Conclusions
For the training of practical ability for full-time Master of Engineering in computer technology, corresponding solutions are raised, including that detail the training plan, increase practice hour; standardize teaching segment, raise the proportion of practice teaching, standardize practice segment, establish off-campus practice base with high quality, and formulate the assessment standards of practice part in the graduation thesis design, and so on. Various measures to improve the training of practice ability for full-time Master of Engineering in computer technology are mentioned.

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