Research and Practice for Master's Education of Computer Science in Nationalities College

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ABSTRACT—*Professional master education is an important part of china higher education in nationalities universities. This paper analyzes the current problems of professional master education in nationalities universities. We applied "level teaching method" to computer professional master education and their research for Dalian Nationalities University to solve these problems. Our method includes four aspects: "learning foundation", "paying attention to practice", "learning by doing", "increasing gradually". The results in recent years show that our master teaching reform helps to improve the computer level and computer comprehensive qualities for professional masters of computer science effectively.*

Keywords—Graduate Education; Teaching Reform; Professional Master
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1. INTRODUCTION

The postgraduate education in china has been the academic education for training the academic research talent for a long time. But from the current employment situation, we can know that only about 10% of the students went to universities and research institutes engaged in scientific research work after graduation, while about 90% of the students engaged in applied work. Obviously, the postgraduate education and demand of reality has huge disparity in China currently [1]. So the Education Ministry of China has decided to focus on the education for the professional master (the goal of this education is to cultivate practical talents). By 2015, the number of China's professional master and academic master is going to achieve the ratio of 1: 1[2].

Dalian Nationalities University began to recruit professional master of computer science from 2010. Now, there are still many problems during the period of cultivating the masters in recent years which can be summed up as follows:

(1) The postgraduates of Dalian Nationalities University mainly come from the minority areas where the level of education is relatively backward. Furthermore, many postgraduates come from other professional, so a general problem is that the students have not learned many computer courses which lead to their weak practical ability of solve practical problems.

(2) We had already set up several computer basic courses in the first semester of the post graduates, but it is difficult to improve their practical ability in a short time because of their major and basis, etc. Apparently, it affects the completion of professional graduate future research work and thesis at a certain degree.

To solve these problems, we applied "level teaching method" for postgraduate education as the reform on educate content and educate method to our computer professional masters. The education results show that our master teaching reform helps to improve the computer level and computer comprehensive qualities for professional masters of computer science effectively.

2. CONTENTS AND METHODS OF TEACHING RESEARCH

We applied "level teaching method" to graduate education for their poor computer foundation and engineering

practice ability and other characteristics. Our teaching methods can be summarized as four aspects: "learning foundation", "paying attention to practice", "learning by doing", "increasing gradually".

(1) "Learning foundation". We constantly teach the most closely related knowledge about software applying in our teaching and research procedure for masters. This knowledge includes software engineering, UML basics, software testing basics, computer hardware basics, computer network, etc, which can provides students with more solid computer basics.

(2) "Paying attention to practice". The difference of training between computer professional master and the general academic master is that the former need to focus on promoting their engineering practice ability. That means we should focus on students' ability to apply the knowledge to analyze and solve the problems during the process of teaching and research.

(3) "Learning by doing". We put doing experiments, doing projects and other ways to training students' practical ability of engineering practice as a majority in the student learning process. This can not only improve the students ' practical programming skills, but also can improve students' innovative capacity and ability to cooperate between them, which is very useful for the student employment and further study in future.

(4) "Improving gradually". Improving gradually means that the engineering practice ability can't be done overnight, which is a process that should be improved gradually. Therefore we impart knowledge about software development and design firstly, then gradually improved their software development capabilities, ability to solve problems and some research capability by the way of "learning by doing". The research capability includes information searching and how to write scientific papers, etc. We generally require students to publish a scientific paper as first author during the two-year Master's study.

We divided the training process for students into four steps according to our teaching methods (As figure1 show).

(1) Basic knowledge of software development and design

Since most of computer masters have not learned specific knowledge of software development in the undergraduates, it is necessary to impart software knowledge and the software experience to students. In this phase, the tutors tell the knowledge required in the software development process to students, such as Software Engineering, UML, how to write various documents, etc. This process should not take too much time for our students, the further knowledge and experience will be explained in project development.

(2) Computer experiments and tasks

This step required the tutors to arrange tasks (small projects with some functions) to students according to their research direction. The projects will be completed by students independently which can not only improve their level of programming and practical engineering capability, but also help them to master their own subject- as soon as possible.

(3) Database project

Let the students divided into groups (each group has 2-3 students), each group had to   complete a complex database project (such as shopping system based on Web, library management system, etc.). During the process of project, the students must complete various reports of project (such as requirements specification, project design specification, detailed design specification, etc.). This can effectively improve students' ability of cooperate, innovation and to solve practical problems with computers.

(4) Project of tutors

We required students to participate in the actual project of tutors. This can not only improve their ability of engineering practice, but also improve their research capacity (such as how to search information, how to write papers, etc.). Consider that many students are likely to choose further education after their graduation, so we think it is necessary to improve their ability of research. The projects of tutors generally come from university-enterprise cooperation projects, the mentors, etc. And we require students to complete at least one scientific paper in this process.
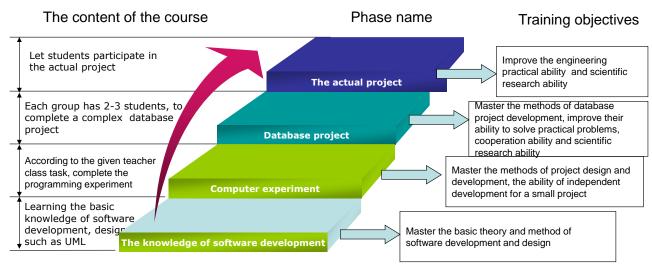
Figure 1: Reform of graduate teaching content and training objectives

3. SUMMARY

The professional master education in nationalities universities is an important part of china higher education. This paper analyzes the current problem of professional master education in nationalities universities. We elaborate the reform of teaching methods and teaching contents for computer professional masters in Dalian Nationality University. In recent years, the education results show that our master teaching reform helps to improve the computer comprehensive level for students, and the student's actual operational capacity has been improved apparently as well.

4. ACKNOWLEDGEMENT

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