Some Views on Training "Full-time Professional Masters"

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Abstract - The current development about the education of professional master in China is analyzed. Due to the deficiency in cultivation for full-time professional master in China, the homogenization between the education plan for professional master and academic master's, the unreasonable arrangement of course credits and the unicity of assessment for teaching arise. Specific proposals and measures to solve these problems were put forward on the basis of a comprehensive analysis of the causes and the analysis of the foreign professional master training experience, to improve the professional master's practice ability and innovative thinking, and better the training mechanism for the full-time professional master in China.

Index Terms - Chemical Process Equipment, Professional Master, Educational Plan

I. Brief Introduction to the Development of Professional Master in China

A. Scientific definition of professional master

The goal of training professional master is to grasp solid theory and widen professional knowledge in a certain field, acquire strong ability to solve practical problems, so that they are able to undertake professional technology or Management jobs and highly-talented professionals with applied training skills [1]. Although professional degree and academic degree are in the same level, they focus on different goals. The former set by disciplines is oriented towards academic research and stresses on theory and research, aiming at training high-level talents and researchers in scientific research institutions [2]. However, the latter is oriented towards practice, stresses on practice, and application with the purpose of training high-level engineering talents who have received formal professional training. The prominent characteristic of the professional degree education is the tight combination between academy and profession. People who get professional master degree are not primarily engaged in academic research, but do jobs which have obvious professional background such as engineers and doctors. Therefore, it is necessary to carry on different teaching method, courses, as well as the standards and requirements of rewarding degree. The cultivations of Professional Master should pay more attention to practical ability and specialized skills.

B. History of professional master in China

Education of professional master has developed rapidly for the past few years in China. There have been more than thirty-nine classes of professional master degree by far while there was only one talents training pilot of MBA in 1991. However, early education of professional master is not for full-time learning and conditioned to the "admissions" and "degree" at the same time. At that time students recruited were mainly people who were at work and they were only rewarded the diploma without graduation certificates generally, which limited the development of professional master to some extent. With the development of the national economy as well as the adjustment of economic structure, the demand of application Masters is gradually increasing. In this case, the Ministry of Education decided to open nineteen professional master degrees including engineering master degree to graduates and enlarged the recruitment scale of professional master by adopting full-time education gradually in 2009, which indicated that China was adjusting the structure of post-graduate masters' cultivation and the transforming of academic talents centered pattern into applied talents centered pattern begins [3].

In the early stage of implementing full-time professional master education, institutions of higher learning trained professional master with the same pattern of academic master because of the relatively small number of professional masters. For example, masters' entrance examination did not distinguish between academic master and professional master. It was the same with the graduate paper. However, the proportion of professional master has remarkably enhanced inspired by relevant policies in recent years. In 2012, the proportion of professional masters has increased to thirty percent compared with six percent in 2008, which is expected to increase to more than fifty percent by 2015. With the number of professional masters increasing year by year, many aspects need to be amended and perfected correspondingly, for instance, academic master and professional master were distinguished when people registered for the entrance examinations of master in 2013. Therefore colleges and universities should transform their early training pattern of academic talents centered into a new pattern which balances academic master and professional master gradually according to the new change. Besides, institutions of higher learning should also work out a serious of training program and educational pattern corresponding with the purpose that our country set professional master degree. Yet it is really a pity that there are still substantial drawbacks existing in the process of training professional master due to the short duration of implementing the full-time professional master system in China, the low recognition of professional master degree, the deficiency of the according human resources and educational resources between society and universities. Consequently it is exceedingly urgent for people to pay more attention to their problems and overcome them gradually. This paper takes the professional master of chemical process machinery for

example, analyzing and discussing some problems existing in the training of full-time professional master and putting forward some relevant proposals in the hope of providing some help to enrich and improve the educational pattern of professional master in China.

II. Problems Existing in the Current Training Process of Professional Masters in China

Different colleges and universities have been exploring and improving the educational pattern of professional master based on their practical conditions and have achieved some accomplishments since the full-time professional master' degree education was set for the first time in China in 2009. However, there are still many urgent problems remaining to be solved in the process of practice.

A. Homogenization of training programs

Given the late beginning of professional masters' training in China, there are many weaknesses such as the supporting system construction, training programs establishment, the selection of course objectives, faculty members and training practice basis. Due to the few students in the early stage, most colleges directly applied the training program of academic master to professional master, which further led to the generally identical training program [4, 5]. Table I shows the training program of a university's master degree in 2012. It can be concluded that the degree courses of professional master are almost the same with those of academic masters except that some public basic courses are slightly different due to different credit requirements. This phenomenon is particularly obvious in the professional basic courses. Besides,

TABLE I Comparison in degree courses between professional master and academic master of chemical process machinery in a university

	Professional master			Academic master		
Course Title	Course categories	Classroom hours	Credit	Course categories	Classroom hours	Credit
Basic English I	Public basic	64	2	Public basic	64	2
Basic English II	Public basic	32	2	Public basic	32	2
Numerical Analysis	Public basic	32	2	Public basic	32	2
Applied Statistics	Public basic	32	2	Public basic	32	2
Mathematical Equations	None	/	/	Public basic	32	2
Matrix theory	None	/	/	Public basic	32	2
Tensor analysis	None	/	/	Public basic	32	2
Socialism with Chinese Characteristics	None	/	/	Public basic	36	2
Intellectual property rights	Public basic course	32	1	None	/	/
Dialectics of Nature	Public basic course	40	2	Electives	18	1
Elastic-plastic mechanics	Professional basic	32	2	Professional basic	32	2
Higher heat transfer	Professional basic	32	2	Professional basic	32	2
Modern control theory	Professional basic	32	2	Professional basic	32	2
Principle of optimality	Professional basic	32	2	Professional basic	32	2

it is extremely universal that one teacher gives lessons to both professional masters and academic masters at the same time. The author argues that the root cause lies in the fact that colleges do not set the precise educational objectives of professional master in the right positions. Some universities see professional master as subtype of academic master. Even some colleges treat professional master as another income source. All these factors contribute to the fact that the allocation of teachers, course arrangement and training plans can not be devised by the features of professional master, which affects its development of in the long run.

B. Too much rigidity in credits arrangement and too large ratio of required courses

According to the requirements of the Ministry of Education, courses arrangement of professional master should be oriented towards application and professional requirements. Courses are to combine theory with practice and stand out case analysis and practice research, pay more attention to develop ability and awareness of exploring practical problems. Students are to attach more importance to the development of practical research. Besides, they are to also obtain their working experience, shorten the time of adapting to employment. Based on the information above, the author holds the idea that we should spare more efforts to provide more opportunities of practice for professional master especially when their schooling time will be in two years.

Table Ⅱ Credit requirements of professional and academic master's degree in Chemical Process Equipment

Credit Requirements	Academic master	Professional master
Total credits	40 - 42	≥34
Credits	≥24	≥28
Degree courses	≥18	≥21
Research links	≥13	6

It can be conclude from Table Ⅱ that it is extremely irrational in the credits arrangement for professional master. Professional master pays more attention to theory and sessions. Even though their schooling time is one year shorter than academic master, they are required to accomplish four more credits. Besides, they need to get three more credits in degree courses. However, they have seven credits less than that of academic masters in the practical research aspects, which is opposite to the requirements that professional masters should attach more importance to practice and application.

In the case of shortened period of schooling for professional master, universities are also required to enhance their practice ability and career background. To achieve this goal, the author believes that colleges should reduce the classroom instruction and cut back the ratio of degree courses on the precondition of reduced classroom instruction. At the same time we should also increase the types of professional courses for students to select according to their potential

career, which will enhance students' initiative of study and specialized skills.

C. The simple Professional Master Training and the lack of effective management

1) Rigid teaching methods in the process of giving lessons:

It is shown from Table Ⅲ that the scripted, rigid teaching method is very common while the heuristic, discussion-based and exploratory ways are relatively rare. On the stage of classroom, teachers are performers and students are the audiences. Teaching presents the situation of volume production paying more attention to imparting theory and does not get rid of traditional old-fashioned patterns.

TableⅢ Sequencing problems in Teaching Our country's graduates [6]

Problem	Sequence
No Update	1
Scripted, chalk and talk	2
No foreign language teaching materials	3
Teaching is not combined with the practice	4
The materials are old fashioned	5

2) Singular evacuation method:

Most colleges basically evaluate the performance of full-time professional masters by examination currently. Classroom performance and grades was largely invisible and can't get effective use. Practice evaluation mainly refers to internship reports, internship roll books as well as the advice from internship units, which can not evaluate students objectively. Other factors, such as lack of communication between students and instructors, limited supervision, will contribute to the case of false internship. This singular evaluation method can not evaluate professional masters effectively and precisely.

3) No more options for practice and lack of professional management team for professional master:

According to the survey over ten universities in China, it can be found that the main practice means are participating in the subjects of their instructors or practicing in some relevant enterprises. There are many reasons, for instance, lack of fixed suitable factories, bad coordination between colleges and enterprises and insufficient externship time for students. At the same time, what contribute to the above problems is lack of effective professional management teams, lack of timely effective communication as well as coordination between universities and enterprises.

III. Helpful suggestions

A. Distinguish between professional master and academic master's definition

Since China strives to develop full-time professional master degree, professional master degree and academic master degree have lots of similarities. Lack of full-time instructors and teachers becomes major obstacle to the development of professional master. There exists the idea that academic master education has higher quality than that of professional master currently. To change these incorrect ideas, we should distinguish between professional and academic degree strictly and carry out training program respectively. The training pattern for professional masters of different majors in different universities must be diversified due to the different professions and subjects.

B. Optimizing curriculum system and strengthening the awareness of engineering

Colleges should revise training program, optimize curriculum system and enhance the ratio of practice contents. The setting of Chinese credits system centered on teachers' lessons, especially the teaching time of giving lessons, not from students' perspectives. Apart form the time of giving lessons, student's discussion, practical training, and examination and even preview time and reading time should be included in the setting of credits. In Britain, each standard course (20 credits) in the design may need 200 sessions to complete. The teaching arrangement not only combines students with teachers and theory with practice, but also inspires student's enthusiasm and initiative, which deserves further reference.

C. Enriching training methods and improving the pattern of evacuation and management

1) Diversified teaching methods, complex teaching means and comprehensive evaluation:

Firstly, from the guiding principle, our colleges should replace the "injection" teaching method with the participatory teaching methods. In the training process of professional masters, our colleges should associate theoretical study with practical application, apply the challenge and research means to all circles of teaching, to form virtuous circles between teaching and research. The cultivation of professional masters should drive scientific research by teaching practice, practice to promote teaching by scientific research in return, forming a virtuous cycle of teaching and research practice teaching mode. Secondly, our colleges should emphasize the comprehensive application of multiple teaching methods. Thirdly, teachers transform the traditional examination into the combination of interview with examination. Through this method, students not only have to take the given examination, but also take the professional proficiency test through the curriculum report and the comprehensive evaluation interview from relevant enterprises according to the curriculum requirement.

2) Speed up the structure of management teams for professional master:

Around the government - enterprise - School tripartite Joint-mechanism, the management team of professional masters should be established to ensure that the human resource, material and financial resources are invested substantially and effectively. On this basis, colleges should arrange practice teaching for professional master flexibly

according to the specialization of professional masters. For example, institutions of higher learning should divide the internship time of professional master into several phases considering the short study time for professional masters in school. It can be consistent or not in time arrangement for professional masters. The iterative learn - practice - learn process can not only help students to accumulate engineering experience, but also develop practical ability to work. On the other hand, the problems students finding in practice and work can be brought back to classroom to classify their goals of study next phase and to enhance the effect of study.

3) *Structuring off-campus internship base to train talents in different areas by multiple ways*:

Off-campus internship bases not only bear traditional internship and practical training for students, but also make a difference in employment, technology service. However, lots of internship bases are not effectively used. Furthermore, experienced advanced engineers are precious resources. Colleges should recruit some advanced engineers as part-time instructors to instruct students finish their paper in enterprises, which not only gives students a chance to receive engineering training but also solves problems of enterprises. Establishing mature evaluation system of internship should make sure internship results, through which we could fulfill the education goal of deep foundation and wide area and turn professional masters into enterprises' reserved talents.

IV. Conclusions

In this paper, taking the training of professional master of chemical process machinery for example, the author gives a detailed analysis on some questions arise from the training process of full-time professional master in China. These problems included the "homogenization" between the education plan for professional master and academic master, unreasonable course credits arrangement, the backwardness of practice base construction, etc. Besides, through comparison with relative foreign colleges in training methods and system, referring the advanced complete training management experience in developed countries, combining the current situation of domestic universities, the author proposes helpful advice and measures to solve these problems in the hopes of improving the training system gradually, exploring more effective training methods and establishing a reasonable training system of professional master in China.

References

[1] Ministry of education, "Some advice about making good preparations for the training of fill-time professional master," March 2009.

[2] Z. X. Huang, C. Yao, "Thoughts about the pattern of the training of professional master," Journal of Chinese communist party committee of Chengdu, no. 6, pp. 90-93, 2012.

[3] X. Zhang, "Practical exploration of full-time professional master in materials engineering," Higher Education in Chemical Engineering, no. 1, pp. 21-24, 2013.

[4] X. Q. Lian, F. X. Xiao, "Inspiration of homogenization between the education of full-time professional master degree and higher professional education," Adult education in China, no. 7, pp. 88-90, 2011.

[5] B. Bai, L. N. Wu, "Solutions to the problems exiting in the training of full-time professional master in China," Publishing Journal, vol. 20, no. 5, pp. 18-21, 2012.

[6] H. Liu, "Survey report of current situation about master training in China," Education of modern university, no. 4, pp. 26-28, 2004.