

Innovation and practical exploration on professional training mode of engineering cost

—A case study of Wuhan Textile University

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Abstract—Firstly, the paper summarized two basic education modes on the engineering cost (EC) major in Chinese universities and colleges through field study. And then, according to the actual situation of Wuhan Textile University (WTU), develop innovated approach of training EC professional through four aspects of training model innovation, subject intersection, highlighting comparative advantages and practical ability promotion. At last, the paper described the practical exploration of the School (short for the School of Accounting in WTU) from four aspects including general goal of talents cultivation, curriculum system, practical teaching and cooperation in running schools, etc. The research results offer reference to the teaching study and practice of the EC major in the similar colleges and universities of China.

Keywords—Talent Training; Innovative Ideas; Training Mode; Engineering Cost Major

I. INTRODUCTION

Since the engineering cost major is established in Tianjin University of technology in 2003, the cultivation of talents with undergraduate degree has been developing for more than 10 years. During this period, the enrollment of the major is carried out independent outside the "Basic undergraduate majors directory of colleges and universities made by the Ministry of education" or as a sub-major of the engineering management major. Due to lacking of uniform education requirements and the difference of the universities and colleges, development target of the major differs from each other in domestic universities and colleges. Thus for the past ten years, the differentiation of running school - basing on the universities and colleges' academic discipline, meeting needs of the society in different areas has become a consensus. In 2012, the engineering cost major join in the "Basic undergraduate majors' directory of colleges and universities made by the Ministry of education", which causes the rapid expansion of the

enrollment, so differentiation of running school and improving the performance of talent cultivation plays an important role for the newly established engineering cost major in the School.

II. PRESENT SITUATION ANALYSIS

In years between 2002 and 2012, although universities offering engineering cost major at the undergraduate level become more and more, the major still did not belong to the "Basic undergraduate majors directory of colleges and universities" made by the Ministry of education, which then made the target, cultivating methods and selection of service objects of running the major differs from each other among universities.

Until now, the following two kinds of educational ideas about engineering cost major of national colleges and universities are shown as below [1]:

For one, some engineering universities (such as Shenyang Jianzhu University, Xihua University etc.), relied on supporting of the technical or basic subjects such as civil engineering etc., established the undergraduate major of engineering cost, cultivated outstanding graduates with practical techniques and skills, meanwhile, project site management and project cost management in the future is emphasized and cost engineers and constructors are set as the graduates' Career planning objectives.

For the second, some engineering universities (such as Tianjin Polytechnic University, Northeast University of Finance and Economics etc.), relied on the supporting of its management, economics, finance and other basic subjects, relatively weaken the ability cultivation of students in engineering technical, turned to the ability cultivation of project evaluation, financial accounting, contract management, cultivated Management bachelor degree graduates.

Undergraduate major of engineering cost in the School in WTU was established in 2010, according to the "Notice of college major setting filing or approval made by Ministry of education in 2010", WTU had gained undergraduate enrollment eligibility for engineering cost in 2011, 107 students were enrolled in that year and 129 for 2012, 17 newly-added transferred from other majors, 111 for 2013, 18 newly-added from other majors, 86 for 2014, 15 newly-added from other majors, 86 for 2015. At present, 472 students of the major studied in WTU. As a newly-built major that faces the development of regional economy and the demand of the industry, the construction and development of the major always followed the cultivating plan of innovative talents, based on the advantage of backwardness, committed to build a solid platform for subject development through the integration of superior resources in many subjects, differentiation of running school is sought through the interaction between teaching and scientific research and other ways, seeking to build a local characteristic brand in education in a short period of time is tried.

As a new major established in the School in 2011, central location of the major is to realize the significant differentiation in WTU from other universities, so that the cultivated talents can gain their competitive advantage in the context of mass education of engineering cost in domestic universities at present [2]

III. INNOVATIVE IDEAS OF TALENTS CULTIVATION IN ENGINEERING COST MAJOR

Led by the concept of "market oriented, cultivating high quality and high quality compound practical talents", based on the macro-demand of "serving regional economy as the main goal, serving the urbanization construction in Hubei province as the foundation, serving the nation's infrastructure construction as the final goal" and the orientation with target of engineering cost major cultivation made by the Ministry of education, the engineering cost major in WTU establish the basic orientation of the major, which is based on the multi-disciplinary advantages of Management, Economy, Finance, Environment and City Planning, Machinery, Materials etc., highlighted the subject synthesis and specialty intercross, made the market demand and qualification requirements as the guidance, cultivated comprehensive applicative talents who own high quality during the whole process of cost management field and who are capable of serving new type of business with engineering cost consultation knowledge, planned the cultivating target of the major and cultivating system of talents[3].

A. *The talents cultivating mode of "thick foundation, broad caliber, high quality and great ability".*

The talents cultivating model is closely related with development planning of the School and the major orientation. Emphasized the leading role of scientific education ideas, paid attention to development direction of mutual integration of scientific education and humanistic education, practiced in the broad caliber talent cultivation mode based on general education, meanwhile, the "San Chuang education" of creation, innovation and entrepreneurship is implemented, and the

satisfaction degree of the employers is set as the final quality assessing standards.

B. *Integrating the advantages of the subjects' resources, highlighting the characteristics of major intercross.*

The construction and development of the engineering cost major is mainly led by teachers from economic and accounting major and engineering cost major, supported by the teaching of basic theory courses and basic major courses relied on sources from the Management school, Economics school, Environment and city planning school, Materials school, then the idea with the feature of complementary advantages and major intercrossing is formed.

C. *Combining orientation characteristics of the major in domestic universities, highlighting the comparative advantage of the major*

The engineering cost major in WTU is constructed based on fusion of two construction ideas in domestic universities, relying on subject advantage of financial management, accounting, auditing etc., characterized by the cost consulting business pre and post project transaction, cultivating financial consultants for participants in the projects, so as to achieve the differentiation in supplying graduates to the market.

D. *Meeting the social demand, highlighting cultivation of practice ability and practical ability*

According to the requirement of practice ability and the examination system of registered cost engineer, the engineering cost major talents cultivation system which faced level of registered cost engineer and personnel markets is established, at the same time, linking with the professional qualification system is considered[4]

IV. PRACTICE AND EXPLORATION ON THE CULTIVATION OF ENGINEERING COST MAJOR TALENTS

In accordance with the "National Medium and Long-term Plan for Education Reform and Development (2010-2020)" and the requirements of WTU, the School always adhere to the personality-oriented education and put the cultivation of talents in the work center of the School.

A. *The general objective of the cultivation of engineering cost major talents in the School*

Since enrollment of students majoring in engineering cost began in 2011, combined with requirements of the official document made by the Ministry of education, the School quickly adjusted and determined the general goal of the engineering cost major talents cultivation which not only enable it to meet the uniform requirements of the Ministry of education but also possess characteristics of strong subject foundation in Finance, Accounting and Audit, so as to provide the social cost management talents with differentiation in the future.

B. Teaching content responding to the nature of the cultivating objectives

As the host unit of engineering cost major in WTU, the subject strength of accountancy, financial, accounting, auditing in the School is strong and the subjects mentioned above can also support the running of engineering cost major effectively. In view of this, the characteristics of the major in the School is defined as: the graduates can bear all kinds of work in the field of engineering cost and own the ability advantage of project cost audit, project cost economic dispute appraisal and project finance consultant. Accordingly, subjects were selected and combined scientifically in the teaching program, so that the teaching content could respond to the nature of the cultivating objectives, which provided the basic guarantee for the graduates to meet the requirements proposed above. For example, "project financing", "project feasibility study and evaluation", "project audit", "asset evaluation", "real estate enterprises accounting", "financial analysis", "economic law", "tax law" and other major courses which will be further optimized and adjusted in the future are opened in the new version of the program. The School are striving to make the features of the engineering cost major more prominent, which will make the major in the School a measure of success in the area of running the engineering cost major with differentiation among the domestic universities[5]. To see TABLE I for table of hours and credits and TABLE II for major courses platform.

TABLE I. TABLE OF HOURS AND CREDITS

Courses Classified		Period/Weeks	Credit		Proportion of Period
			Theory	Practice	
General Courses Platform	Required	720H+3W	24.5	13	30.3%
	Elective	128H	8	0	5.2%
Basic Courses Platform	Required	464H	29	0	18.90%
Major Courses Platform	Required	512H	28	4	20.80%
	Elective	608H	38	0	24.80%
Amount	Required	2456H	127.5	17.5	70%
	Elective				30%
Practical Teaching Platform	Required	23W	11.5(0+11.5)		20.3%
	Elective	8W	2+2		
The Lowest Graduate Credit		160			

TABLE II. MAJOR COURSES PLATFORM

Courses Classified	Courses Names	Period Classification		Notes
		Theory	Practice	
Required Courses	Engineering Economics	32		
	Project Management II	40	8	
	Architectural Plans and Construction	40	8	
	Construction Engineering Drawing	32		
	Engineering Quota Principle	40	8	

Elective Courses	Engineering Metrology	40	8	
	Construction Technology and Organization	40	8	
	Engineering Valuation	40	8	
	Projects Tendering& Contracting Management	32		
	Legal System and Contract Management of Engineering Contract	48		
	Computer Aided Engineering Cost	24	8	
	Project Audit	40	8	
	General Outline of Installation Engineering	32		Minimum Requirements for Elective Credits:38 Elective Credit of Each Semester: 0, 0, 10, 8, 6, 8, 6, 0 Credit of Each Elective Course:2
	General Outline of Equipment Engineering	32		
	Building Structures	32		
	Accounting of Construction Units	32		
	General Outline of Building	32		
	Engineering Material	32		
	Tax Accounting	32		
	Basis of Fashion Design	32		
	General Outline of Engineering Cost	32		
	Cost Accounting	32		
	Building Regulations	32		
	Economic Law	32		
	Engineering Mechanics	32		
	Textile Trade	32		
	Game Theory & Information Economics	32		
	Financial Analysis	32		
	Government and Non-profit Organization Accounting	32		
	Management Accounting	32		
	Project Risk Management	32		
	Asset Evaluation	32		
	Real Estate Accounting	32		
	Contract Management for International Project	32		
	Environment Accounting	32		
	Data Mining	32		
	Econometrics	32		

	Nonwoven Engineering Design	32	
	Accounting Information System	32	
	Engineering Cost Economic Dispute Appraisal	32	
	Management Information System	32	
	Project Financing	32	
	Applied Statistical Analysis	32	
	Financial Analysis	32	
	Project Feasibility Study and Appraisal	32	
	Entrepreneurial Management	32	
	Tax Planning	32	
	Advanced Financial Accounting	32	
	Scientific and Technical Information Retrieval	32	
	Financial Practical Writing	32	

C. Focusing on the platform building of analog practice education, expanding the training base construction outside campus actively

The talents cultivating program of the major in the School attaches great importance to the cultivating of students' practical ability[6], substantial progress from the teaching and training platform to the construction of the training base has been made. Firstly, the major cultivating plan was revised in 2012, practice teaching processes including quantity calculation workshop, engineering budget preparation, APC testing are added based on the former plan. Secondly, since the end of 2012, the engineering cost comprehensive laboratory construction program was started, and at present the laboratory has been built and put into use. Finally, with the strong support of leaders of the School, the teaching team of the major had established stable communication mechanism with the engineering construction management terminal of Hubei Province, WISDRI Engineering & Research Incorporation Limited, channels of practice ability cultivation are increasingly diversified.

D. Cooperation in running schools, education, employment and development

The running of higher education has entered an era of popularization, marketization and socialization, so it is necessary to make full use of all kinds of social resources. In view of the characteristics of professional practice and comprehensive application of engineering cost, talents cultivating in the major needs to combine with the market demand in the industry widely, and integration of kinds of social resources for students to create opportunities of getting in touch with the front line of the industry is necessary, increasing practice teaching and simulation of future practice

environment, to enhance social adaptability of the graduates had also been considered carefully[7].

The School had signed the framework agreement of running the major jointly with Hubei provincial Construction Engineering Standard Quota Management Terminal, and the master of the terminal had been appointed as a visiting professor, and then the first step of running the major with social resources was taken. In the agreement, both sides proposed the cooperation guidelines as "combination of production, teaching and research, reciprocity and mutual benefit, advantage complementary, Win-win interaction, common development and the establishment of joint major running mechanism". In the future, engineering cost major in the School can make full use of the resources of the terminal, strong support in training base construction outside campus, reforming of the curriculum system, talents cultivating and employment information, taking of thematic reports and lectures, construction of comprehensive case teaching etc. may be received.

V. SUMMARY

Relied on sources from the Management school, Economics school, Environment and city planning school, Materials school and led by teachers from finance and accounting major and engineering cost major, the idea with the feature of complementary advantages and major intercrossing on the talents cultivating of the engineering cost major in WTU is formed. Differentiation of running school is sought through meeting the social demand, highlighting cultivation of practice ability and practical ability etc. and building a local characteristic brand in education in a short period of time is being carried out.

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