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Setting up Financial Engineering Curriculum Based on CDIO Education Idea

CHENG Shujia[a],*; XU Yanwei[a]

[a]Associate professor. School of Economics, Changchun University, Changchun, China.
*Corresponding author.

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Abstract
CDIO engineering education model is the latest research achievement of the international engineering education reform in recent years. Based on CDIO education idea, this article explores the overall reform for the curriculum of financial engineering, including theory course system and practice courses system and aims at building a curriculum of financial engineering to enhance creative spirit and practical ability.

Key words: CDIO; Financial engineering program; Professional training model

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INTRODUCTION
CDIO are initials of Conceive, Design, Implement and Operate and outline the life cycle of an engineered product or service, including four stages. Through the process of CDIO, students can develop their initiative, learn knowledge in practical way, and get a perfect combination of work ability and subject knowledge. The educational idea of CDIO is beneficial to correct some problems, such as paying more attention to theory and looking down on practice, emphasizing individual ability and ignoring the team cooperation spirit, laying stress on learning knowledge and overlooking the cultivation of innovation ability, which have developed to a certain extent in higher education nowadays. So a scholar has pointed out:

> CDIO model emphasizes comprehensive innovation ability and coordination development with the social environment, and at the same time, pays more attention to the cultivation of students' practical ability. The practice of Chinese model of CDIO engineering education will become an effective way to cultivate innovative engineering professionals (Li, Lu, & Xiong, 2008).

CDIO is a set of concepts of engineering education and a system of the implementation. If the CDIO model is adopted, it has new requirements for setting up professional curriculum, teaching methods, evaluation standards, and even teacher's roles in teaching and learning. The core of CDIO is to use the engineering design as the guide and project training as the carrier to reset up the curriculum and teaching model based on requirements of engineering profession for students' knowledge, ability and quality (Chen, Zhang, Cui, Wang, & Jiao, 2012). This paper summarizes and analyzes the process of building curriculum system of our financial engineering program in a new exploration of cultivation model for professionals based on CDIO idea.

1. RESEARCH CONTENT

1.1 The Overall Thinking of the Reform of Financial Engineering Program
Based on CDIO idea, the reform of financial engineering program aims to train senior professionals who can completely grasp the basic finance theory, basic theory and technology of financial engineering, have the certain level of ability to make financial decisions and design innovative financial products, meet the needs of modern financial development, be qualified to do financial business, technical and management work in banks, insurance, securities, trust and other financial sectors. In the reform, training students' ability is the core. We have referred to the CDIO concepts of personnel training, determined the training specifications for

financial engineering professionals according to the needs of society, made professional training scheme in line with the requirements of the industry, set up theory course system and practice courses system. Through the reform of the curriculum system, let the graduates achieve the predetermined teaching goals in conceive, design, implement, operate ability, and have stronger self-learning, organization and communication, the coordination ability and so on.

1.2 Build Theory Course System in Financial Engineering Program

The new training program emphasizes comprehensive and reasonable knowledge structure, and the cultivation of innovation ability, learning ability and emotional quotient. In line with the requirements of professional training system, we build and develop a system with integration of theory and practice curriculum to train students for different ability.

In the new training program, the curriculum module system consists of common basis module, professional basis module, professional technology module, professional direction module and cultural quality module.

In the course system of financial engineering, the common basis module and professional basis module form the knowledge platforms: public basis theory knowledge and the basis theory of the subject. The common basis module includes the Marx philosophy, political economics, Mao Zedong Thought, Deng Xiaoping Theory and other ideological and political theory courses, which cultivate students' correct world outlook, outlook on life and values; moral, social, legal and other curriculum related to basis knowledge of life and society, so that students can understand the knowledge and cultivation of qualified citizens. The common basis module also includes some courses such as mathematics, English, computer and so on, so that students can master the basic ability of internationalization and information technology application in the modern society and lay the foundation for lifelong learning and personal development. In the new training program, we add the Chinese modern history outline, situation and policy analysis and the introduction of the important thought of Three Represents, the adjustment of this part puts more emphasis on fostering students' world outlook, value outlook and outlook on life. The professional basis module is the platform of the basic theory of the subject, mainly including the professional core basis courses. Professional core basis courses cover basic theory knowledge of financial sector, including finance marketing, risk management, asset assessment and so on. The professional technology module and professional direction module emphasize on cultivating students' professional skills, including financial derivatives, fixed income securities, modern corporation finance, actuarial analysis and practice, application of stochastic process, multivariate statistical analysis, time series analysis and other financial courses.

The revise of professional module builds a basic platform for students to better have the basic work ability in financial field. In the direction of professional ability courses, we set up two groups of professional courses corresponding to two directions: innovation of financial products and financial risk management. In revised financial product innovation and financial risk management courses, the goal of professional skill training is more prominent, and these courses meet students' needs for further study in specific areas of financial engineering business. At the same time, setting up the course system is based on the financial market which is the main work environment, focus on the cultivation of students' market analysis ability, making investment decision ability and practical business operation skills. Especially by adding financial derivatives, fixed income securities, actuarial analysis and practice, application of stochastic process, multivariate statistical analysis and other financial courses in the curriculum system, effectively improve students' market analysis, investment operation and specific financial business working ability and fully reflect the objective of cultivating professionals with professional skills.

In the revise of the new training program, preserve the cultural quality module and emphasize the cultivation of students' humanities attainments, which enhances students' humanistic feelings.

1.3 Build Practice Course System

The main goal of practice course system is to train senior professionals to master professional skills in new product development and risk management. According to the requirements of financial engineering for basic professional ability, professional core ability and comprehensive professional ability, build the experimental teaching system. By analyzing the structure of knowledge, ability, quality which students should have in financial engineering program, determine the basic professional ability, professional core ability and comprehensive professional ability. Basic professional ability includes mastering qualitative and quantitative analysis method of financial engineering, and economic analysis and quantitative analysis skills. Professional core ability needs to have basic skills training in managing money matters, investment and financing, and risk management methods and skills, and have a basic ability in design, development, and integrated use of various financial tools to solve financial problems creatively. The comprehensive professional ability needs to have a comprehensive ability and management ability to deal with the business related to banks, insurance, securities, trust and other aspects of business, and have a certain level of ability in financial decision making and innovative financial product design.

A good and scientific practice course system helps to realize ability training objectives, and is an important content in the cultivation of professionals with skills. With

our leadership support, the financial engineering program has formed a complete practice course system, including course design, course thesis, training, simulation training and graduation design and so on according to the demand for the training. To achieve the related ability by setting the corresponding practice training. Professional skill training achieved by the following:

1.3.1 The Course Design and Course Thesis

The course design and course thesis are important contents of practice courses, based on basis experiments and information processing skills, use main professional courses as the core to enable students' perceptual knowledge rising to rational knowledge, complete, clear understanding a certain course, in order to improve students' practical ability.

1.3.2 The Simulation Training and Internships

The goal of the simulation training and internships is to let students apply the basic knowledge of various courses above mentioned, the basic methods and basic operation skills of professional experiment courses in practical exercises; not only that, the simulation training more inclines to the actual financial product innovation and risk management issues, students are required to conceive, design, implement, operate innovative products, implementing "the project (act on one's own), consulting literature material, determination of design scheme, design calculation, product testing, analysis and summarizing, discussion and defense" practice in a project. There is a full range of integration of training which train students' creative thinking, creative ability, scientific research ability, design ability. It will achieve the unification of curriculum, skill, ability, totally enhance the quality of students, and lay the foundation for their future jobs. In order to achieve good results, the simulation training makes the best of real or simulated operation experiments, so that students can experience real business environment in experimental processes.

The internships of practical professional courses mainly have vacation (summer) internships and internships after graduation etc. The research group increases the intensity of building training sites which meet the requirements and expands the scale of training sites outside. It is also a very important content of practice course system. By the college and enterprises working together, realize reasonable allocation of teaching resources. Through the internships, students have the opportunity to go to practical jobs to drill, which enable students to enhance their perceptual knowledge of work in practice, greatly improve the practical ability of students, and improve students' comprehensive abilities of using various professional skills. At the same time, through the establishment of practice sites, enterprises and the college can work on some research, which improve teachers' scientific research ability, make the school and enterprises achieve a win-win situation.

1.3.3 Graduation Design

Graduation design is an important content in the practice course system, shows students how to use the knowledge, the results of cultivation of innovation ability, and is an indispensable part of improving the practice ability. Around the requirements of curriculum system, the research group elaborates organization, arrangement, standardized management, guide the students using their spare time to go into practice to investigate, understand, and open thinking, which guarantee that project selection is associated with social practice, reduce the research behind closed doors. Identify projects after the full feasibility study, and then from the collecting data to financial product design, defense, scoring and so on, the research group formulates the relevant rules and standards, strictly guarantees the quality of graduation design.

2. RESULTS AND DISCUSSION

Generally speaking, curriculum and practice teaching project are set to correspond to the ability in the new training program. Various levels of work ability are guides for designing curriculum and practice teaching system, also are the goals and evaluation standards for the curriculum and practice teaching system. In the design of the curriculum and practice teaching system, the demand for ability decide the content and structure of the curriculum and practice teaching system, and the curriculum and practice teaching system are integrated to meet the requirements for students' ability. The arrangement of the curriculum and practice teaching system has different purposes. Some curriculums and practice projects work for training a skill or one course also works for training several skills.

The reform of the financial engineering program has the goal which is to train financial professionals. We have built the integrated curriculum teaching system with several modules, on the basis of further improving and perfecting professional courses of conventional teaching, built two systems for teaching theory and practice, and strengthened the connection between the two main systems, emphasized the cultivation of innovation spirit and comprehensive quality.

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