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How to Build Practice Teaching System of Financial Mathematics in Local Universities

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Abstract
In this paper, the writer combined the experience in financial mathematics direction teaching with the results of the survey of tracking graduates, and analyzed the necessity for local colleges to carry out practical teaching in financial mathematics teaching. What's more, the writer also proposes some suggestion in establishing practical teaching system of financial mathematics.

Key words: Financial mathematics; Practical teaching; Teaching mode

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Along with our country economic system from planned economy to market economy transition, the securities industry and the rapid development of the insurance industry, financial industry gradually with international practice and participation in international competition. Especially China entered into WTO, the financial industry is facing new opportunities and challenges, financial risk has become a huge problem we are faced with, for a variety of innovative financial instruments to the increasingly urgent demand. Financial market order can not rely on administrative and judicial means to maintain, it needs high technology and science of finance support. The traditional financial talent has become increasingly unsuited to the development of society, the intuitive experience to manage such a huge and rapidly changing financial market, large computer and the application of financial engineering is rapidly becoming the mainstream of contemporary risk management. Financial mathematics and quantitative finance science in financial market is developing and has enormous potential in China has broad prospects for development. Financial engineering in China's economic reform and system transformation, there are unlimited, can seemingly harmful market volatility into market regulation of autonomic mechanism, thereby reducing the social risks and government burden, its application is also very broad prospects.

Financial mathematics aims at cultivating talents, who have a more solid foundation of mathematics and financial theory, strictly coursing in mathematical finance thinking and scientific experiments especially training in mathematical modeling and computer applications; those talents can also make higher-level econometric analysis of actual data in the economic field, they be able to take the job of statistical calculations, predictive analysis, project development, actual operation and management in bank, securities, insurance, fund companies and other economic sectors; the major also provides advanced applied talents in technical analysis consulting for financial sectors. In order to achieve this goal, it is necessary to improve the practical teaching system of financial mathematics; Moreover we should cultivate qualified practical theory and actual ability of high-quality talents, At the sometime we should try to make the process between learning and using run smoothly so that graduates attend in work faster and better.

THE NECESSITY TO ESTABLISH A SOUND PRACTICAL TEACHING SYSTEM

1. Comply with the State's Development Strategy in Mathematics Majors and Implement the Objectives of the Applied Talents

National program for medium to long-term education reform and development (2010-2020) says universities should put improving the quality as the centre mission for the university development. They should also innovative training model, improve the teaching and education management system, the quality of personnel training, enhance the level of scientific research and the ability of social services. The research reports of mathematics class major development strategy which was released by Higher Education Department and also pointed out that quite a number of mathematics graduates may turn to cross-disciplinary or other research areas. The core or critical of these research areas may be mathematics, therefore, those having a strong mathematical foundation will play key role in their research areas. In addition to financial mathematics, economic mathematics, actuarial insurance and other interdisciplinary subjects, newly emerging cross disciplines such as financial engineering also need a number of mathematics class talents. The quality of student cultivating affects their employment directly, so the implementation of practical teaching on the direction of financial mathematics can help students master and apply mathematics better, what's more, it is good for talents to adapt to the needs of the community quickly.

2. Explore New Teaching Model Through Practical Teaching and Improve the Quality of Personnel Training Comprehensively

Through the improvement of the practical teaching system of the Financial Mathematics Core Curriculum Group, we evolved the traditional tuitional teaching mode and advocated the "theoretical construct -- the actual problem -- driven -- combination of analog operation and practical" teaching method; take quality engineering as a platform, we encourage students to participate in qualifications examination and financial modeling contest by penetrating the mathematical model of curricular and extracurricular the use of mathematical software through a variety of ways. All of these activities improve students' application ability and innovation ability and sense. Secondly, we have explored new teaching mode cooperating with financial enterprise to improve the full system of teaching, trainee, internship and employment. Through multi-faceted and multi-angle scientific reform, the quality of personnel training has been comprehensively improved. The survey tracking 06, 07 level graduates of financial mathematics shows that 78% of them gave advice on strengthening the practical teaching in that major. They also reflected that major was set just for some years and there existed a large short of experience. The previous two relatively weak lead after they graduate it really took a longer time for them to adjust to the work because of lacking practical teaching. If they had been better trained through practice during the school time, they would have shorten the adaptation period and have ground development.

3. Implement Practical Teaching to Meet the Enterprise Needs of Applied Talents

From our investigations and visits to local securities companies, futures companies, insurance companies, banks and other financial institutions, we find China's securities market is booming up and has a strong development momentum in the future, so there will be a great shortage of professionals working in the financial industries especially those using mathematical software to process economic data and make forecast and program trading smouthly. What kind of person society needs, we will cultivate those talents; the practical teaching process is an indispensable part during the cultivation, undoubtedly,by implementing practical teaching we link up learning and using smoothly in the teaching process. In our project, we will also carry out the reform of the trainee internship link to effectively improve the intern effect and lay the foundation for future employment for students, meanwhile we will also provide counterpart talents for the enterprise, reducing their cost of personnel training. In our survey, 93% of graduates thought that mathematics is really useful in real life and enterprise are really like to absorb graduates with mathematical foundations to be engaged in related work.

In addition, how to meet the market demand ?and how to take advantage of mathematical sciences industry in the field of modern high-level economic? Colleges and universities, as the basement of China's economic reform and development and high-level corporate personnel training, are constantly pursuing leading innovations whether in the level of the education system or teaching methods and means. Some domestic key universities, such as Peking University and Nankai University, Shandong University have made tremendous progresses in financial mathematics and financial engineering talents cultivation, they mainly train senior financial personnel for economic development, and transport a large number of specialized personnels to the internationally renowned universities and businesses, but these universities have a richer teaching power and more superior geographical economic that the general local colleges can not match, so their successful experiences can't be directly used for general local colleges. Thus it is worthy exploring how to make full use of the advantage of local colleges, to explore and build a group of financial mathematics direction of the core curriculum practical teaching system .

MAIN ISSUES EXISTING IN PRACTICAL TEACHING AND SUGGESTIONS

1. Increase Practical Teaching Lessons in the Curriculum

Compared with other the training programs of a few years ago, in the 2010 edition practical teaching in the curriculum had been increased, but still it was not enough, such as linking operations research with financial logistics, the courses of computer practice should occupy half of the total lesson, financial engineering should emphasize the application of EXCEL in finance, practical lessons can take up of one-third of the total lessons, also interest theory should be increased to the practical teaching. In our surveys, 80% of the students reflect specialized courses in the theory can be partly reduced, and only through practice can some theoretical knowledge truly be understood. On the contrary, if we do not pay attention to adjust the proportion of the theory and practical teaching, it will be a hard job to stimulate students' interest in learning with too much theory.

The advantages of newly built local colleges offering undergraduate mathematical finance professional:

(1) Department of mathematics in local colleges and universities shoulders for the local by economic construction and social development to cultivate compound talents from mathematics, on the financial talent supply and demand perspective, although in recent years from domestic. The university finance specialized graduation university student tens of thousands, but economic, we develop the existing basic economic, financial sector number is relatively low, lack of scientific decision-making and other conditions, the basic financial enterprises. The lack of professional personnel, financial professionals is still scarce talent, this is local colleges are facing the grass roots, to cultivate application service personnel, to provide the opening and development of financial mathematics professional opportunities.

(2) Various types of colleges and universities in the construction of financial mathematics in the process of accumulation of experience can make new colleges and universities take roundabout way less, by virtue of his decades of accumulated rich experience in running a school and realistic resources condition. And so, according to the "lead", "innovative" ideas, open late inferior position of as a professional new advantages, give full play to its own advantage of backwardness.

(3) Generally speaking, due to the lag of construction of financial mathematics, our country finance undergraduate and graduate students in the mathematical aspects of the training is less, the foundation is relatively weak, and the modern financial theory system the main content involves a great deal of mathematical tools, so that most of the students in financial engineering, investment securities, options pricing theory courses facing great difficulties. In the Department of Mathematics Education Masters in finance mathematics mathematical theory and the method of application type talents, outstanding mathematics and economics, mathematics and finance integration, professional advantage is quite obvious.

2. Increase Lessons and Improve the Efficiency of Practical Teaching

At present, thesis and internship consist of practical teaching of financial mathematics, but some arrangements of the two aspects are unreasonable, mainly as following:

(1) The graduation internship is arranged in the 7th semester, totally 12 weeks, actually this way is not efficient, students generally spend the first week adapting to the internship environment and the last week in summarizing; so the real time in internship positions is only 10 weeks, it is difficult for students to bury themselves in internship. According to the past experience in the securities companies, futures companies, students can only understand the basic operation and analysis, but our training objectives aim at making students be able to take use of mathematical modeling, mathematical software, statistical software to perform deeper level of analysis. Short of time, internship becomes ineffective; another internship after nearly two months of utilization is not high, students are more scattered, wasted a great time. Recommend internships start from the sixth semester, summer, summer vacation two months plus a seventh semester, more than half a year's time, leaving students plenty of exercise opportunities, you can set up an incentive mechanism to encourage students to use the knowledge to solve practical problems. Allows students to experience life in the enterprise to truly appreciate the real work scenarios, prolonged contact can also discover the personality of students for internships, to implement employment issues at the end of the internship. Even though it is not smooth in the original internship employment, internship experience will give the candidates work to accumulate experience. According to the graduates of the survey data show that 90% of students think the internship link is very important, need to extend the practice time.

(2) Students start to choose thesis topics from the second half of the seventh semester, it seems that the time is abundant for there still 8 mouths left before the final defense, but actually the time student finally spend on their thesis is really limited. Some students go out looking for jobs, and some are busy preparing for postgraduate entrance examination at that time. So it is difficult for them to sank in papers, as a result, their thesis quality is not high. Because of this, I recommend dispersing the thesis time to each semester. There is need to arrange all the theses on the last semester, as long as the students have their own ideas on a problem during the usual learning time, they can complete the paper as their graduation thesis by looking up the relevant

document and with the guidance of teacher. It is proved by practice that the quality of theses completed at usual time is much higher than those in the final semester. Take the eight theses instructed by author this year for example, two were remarked as excellent paper. One of them was published in foreign journals after amendment, another two theses were modified from the 2011 National Mathematical Modeling Contest paper. The topics of these papers have been determined in the junior year, and students have much time in their junior year than senior, thus students are more concentrated and more time is spent on the paper. Eventually, the final paper quality is much higher than others after constant modification. So the writer believes that the thesis time is not necessarily to be fixed, in fact the more it is decentralized, the better it is. Any student have ideas during the study major courses, they can do the job in advance. It is also a good way to stimulate students' interest to explore issues.

(3) Make good use of the spare time and held meaningful extra-curricular activities. Financial Mathematics is closely related to the real life, so it is difficult to comprehensively improve the operation and innovation abilities of students only through the curriculum. According to our questionnaire survey, 85% of students thought they did not make good use of the pare time and felt particularly the third year, course work is relatively light, a part of students have passed CET and computer grade examination, resulting in large tracts of spare time wasted. So we an organize students to participate in a variety of investment simulation contests, financial modeling contests, mathematical modeling contests. Participating in these events gives students a chance to exercise and they try to apply learned knowledge to solving practical problems. Since time is relatively abundant, students can discuss with each other completely to solve the problems. And they can continue to stretch to other related issues, reaching to the effect of the analogy. Students can learn from each other and meanwhile improve their organization ability though campus challenge contests between each college. These events can be jointly organized with financial enterprises, which can find good seeds to who first priority will be given on training in the game. Finally, last sentinel employment purposes can be reached.

(4) Improving professional practice. Professional practice is generally arranged in the third grade the second semester as the students to practice in the preparation stage, the main purpose is to help students under two and a half years learning situation, combined with his own personality, clear their own development direction. For example, to visit to actual unit such as securities firms, banks, insurance companies and other financial department, understanding the operation of financial institutions, establish the perceptual knowledge. Such as the arrangement of students to Shanghai, Shenzhen financial department; The off-campus living, such as a visit to the financial exhibition; inviting practical work departments personnel to school lectures, or forum; The various forms of training activities, such as the organization of professional knowledge competition.

The Nobel Economics Prize has been repeatedly granted to those economists who use mathematical tools to analyze financial problem said Professor Wang Duo from Department of Financial Mathematics, Peking University. Unfortunately, the cultivation of our country has just started. Wang Duo thinks what we lack most is the advanced composite talents who master modern financial derivatives and can do quantitative analysis of the financial risks; that is to say they master not only mathematics but also finance. How to improve the practical teaching of financial mathematics and cultivate high-quality talents having qualified practical theory and practical ability to operate is a new topic the major faces. This paper mainly put up with some suggestions on how to perform effective practical teaching from inside and outside of financial mathematics curriculum, I hope offer some reference for equivalent institutions on financial mathematics.

In general, in the increasingly severe employment situation, financial mathematics and financial engineering students still have a better employment prospects, but also more and more socially acceptable, play their own advantages and characteristics. We need to improve the students' practical ability, innovation ability, so that students can better adapt to the social development, highlight the professional characteristics of running a school. Our school in the local undergraduate colleges in the early established financial mathematics, practice shows that our school is successful, can be used for reference in other universities.

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