Talent Training Approach and Training Program Oriented Adaptive Demand for Cross-Border Electricity Suppliers

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Abstract — **The cultivation quality of application-oriented software talents is in close relationship with teaching mode and method, which is an important issue relating to the export of students employment. The key of cultivating application-oriented talents is educational reform. This paper proposes project teaching method of integrating into Problem Based Learning (PBL) starting from software education mode under current engineering background, which changes the traditional method taking textbook content teaching as the center and transfers it to a learning method taking project as the center and assisted with PBL learning method. Besides following the evaluation method of traditional examination, it pays more attention to the process of student research and development project in evaluation process, assesses its ability of problems analysis and solution through supervising practical activities and finally improves the cultivation quality of application-oriented talents.**

Keywords - project teaching; problem-based learning; cultivation of software talent; e-commerce major; adaptive demand

I. INTRODUCTION

At present, there are over 1.5 million people learning software in our colleges and universities every year, which presents a stable trend. However, many big companies and big enterprises expressed the great difficulty in recruiting high-end software talents, while there is adequate source for general software talents. The current situation is that the graduates majored in software in application-oriented universities focus on the mastering of basic theoretical knowledge of the major and have the same quality in the aspect of practical skills as general software talents, which has caused the increasing pressure in employment year by year. How to cultivate high-quality software talents with higher practical ability is an urgent and important issue to be solved for software teaching management personnel to meet the requirements of social economic development in the new century [1]. It has been proposed in national middle and long term education and reform planning that it must establish scientific and reasonable education quality and talent evaluation system, break through various bottlenecks of talent evaluation system, construct corresponding evaluation index system with morality, knowledge ability and other elements, strengthen the cultivation of practice ability of students and promote students to work hard to become talents. The evaluation of undergraduate teaching quality involves a series of complicated index systems, which not only include teachers but also education environment, as well as curriculum setting and is also need to pay special attention to the recognition of students by society. American psychologist and educator Brumm has pointed out that all the students can achieve the requested standards regulated by curriculum objective as long as enough effective time has been spent on study. In collective teaching, the teachers need to provide frequent and timely feedbacks as well as customized help to students, offer them the requested learning time and make all of them achieve the demand of curriculum objective [3] and then solving the problem of learning efficiency and improve the learning quality greatly among students. The teachers can make use of project teaching method and carry out the learning concept (Problem-based learning, PBL) based on problem, which enable students to learn and master the method of problem solving and accomplishment of project research and development.

II. PROJECT TEACHING MODE INTEGRATING PBL

A. Project Teaching Method

Project teaching method is a teaching method developed based on constructivist learning theory and is a teaching activity [4] made by teacher and students together through implementing a complete project, whose aim is to make organic combination of class teaching theory and application practice together and then improve the ability of students in solving practical problems. In the perspective of software technology, the project process mainly includes demand analysis, summary design, detailed design, coding design and test as well as implementation and maintenance of project deployment. However, project management pays attention to project feasibility, research and development progress and cost benefit management etc. Anyway, the accomplishment of projects can be separated from both management and technology. For education, which takes project as the center, the teacher should play the role of project management while the students are technical practitioners. Project teaching takes specific project as the center, makes task decomposition of each stage based on software engineering thinking, and takes tasks as objectives and stages as knowledge system for blueprint construction and makes students study with target in the project.

At present, most of undergraduate universities focus on theory teaching and are relatively weak in practical teaching,

therefore, it needs to design all-around and professional teaching program and curriculum system based on cultivation objectives for some majors with strong practicality, motivate theory study with practice and enable to students to attain credits even with curriculum replacement method. For framework development system B/S structure Web application program adopted with two kinds of development environment, APTECH constructed curriculum system structure as shown in picture 1 from the perspective of research and development. The left is curriculum system of Net technology framework, develop three layer ADO.Net application promoted by database SQL and based on C# language and C/S structural technology and finally accomplish B/A application system based on .Net technology with integration of Ajax/Web Service technology; the right is curriculum system based on light J2EE framework, develop the B/S application of JSP technology starting from Java and OOP technology and assisted by HTML and JavaScript courses, finally construct simple MVC application system with integration of Servlet JavaBean and Web Service technology. Research and develop application system based on B/S with the assurance of above courses and under the guidance of J2EE light SSH framework.

B. Problem-Based Learning Method

PBL is a problem-oriented learning method, which presents constructivism, stresses of placing study in complicate and meaningful problem context, makes students learn scientific knowledge hidden behind the problems through solving the problems by collaborative cooperation, improve abilities of thinking, solving practical problems and self-learning, cultivate the innovative consciousness and cooperation spirits of students[5]. PBL should pay attention to the raise of the problem, problem solution and summary etc.

The raise of problem needs to be connected with related professional knowledge. The students can divide the problem step by step based on WBS decomposition method to reveal the nature of the problem and improve their ability in solving problem. During problem solving, the students need to clarify the objective of solution, clarify "what can they learn from the problem itself", master the key point of learning from the basic concept and finally form complete knowledge system. Finally is the summary of problem solving, summarize and understand the application context of new knowledge. The problem-based learning stresses not only letting the students solve the problem but also making them understand the relationship and mechanism behind the problem. To realize the teaching mode based on PBL successfully, the problem designing is the most important. The problem design needs to present the following characteristics: ① the problem must draw forth the concept and principle related to the learned course; ② the problem should be open and real, such as the technical problem met in project development; ③ the problem should stimulate the learning enthusiasm of students can guide them to explore; ④ the students can make evaluation for the effectiveness of

knowledge, reasoning and learning strategy in a better way after problem solving.
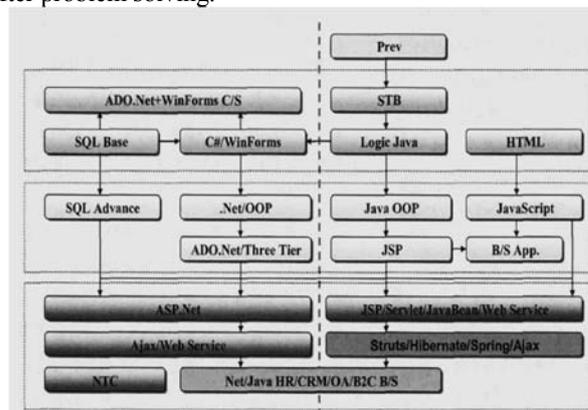

Picture 1. Curriculum system structure of two kinds of development environment

After long-term exercise of PBL, the students can form an active and life-long learning habit, which is with very good promotion function for ability training of problem solving and meets the objective requirement of application-oriented talents cultivation. The cultivation of application-oriented talents should not only pay attention to practical ability but also should not ignore the study of professional theoretical knowledge. PBL can enlighten us to make use of the knowledge structure requested in problem solving to make course group construction. In the project research and development process, each module involves many technologies and the students will turn to professional course study set by teacher naturally when meet problem, therefore, project module division must try to cover professional course system and keep in line with professional course setting. Presume it needs to finish one B/S structure project of J2EE light framework SSH, it can optimize and adjust the system structure of professional cultivation course reversely based on related project courses in picture 1. Table 1 is the comparison of professional cultivation and project demand of software engineering major in colleges and universities both make cross-reference and mutual promotion. The teachers can adjust teaching course cultivation subjects timely based on this and improve the knowledge system requested by application-oriented talents cultivation in a further way.

III. TEACHING PRACTICE INTEGRATING PBL PROJECT

At present, the department of computer science in colleges and universities are strengthening their comprehensive strategic cooperation with TCL multimedia technology, Huayang Electronics and information technology department of Glorious Sun Group, all kinds of application projects provided by enterprises provides opportunities for teachers team as well as the construction of curriculum system. The writer explained with the example of TCL project team, which used SpringMVC+mybatis+Ajax+Jquery technology to reform

Ewatch module written by pure JSP. There are totally 12 team members, who are college students of second college year with no project experience. It studied four parts of content from the angle of realization, which include framework technology, interface technology, database technology and JSP technology. Spring MVC framework technology knowledge system is shown as picture 2. On the basis of original curriculum system table 1, picture 2 added Java series courses properly, especially application and development courses for cultivation of application-oriented talents to provide the requested knowledge to project team in solving practical problem in system development process, such as JSP, JavaScript, JavaBean, Servlet, Web Service, Ajax, JQuery Spring+Struts+Hibernate and other framework technology courses.
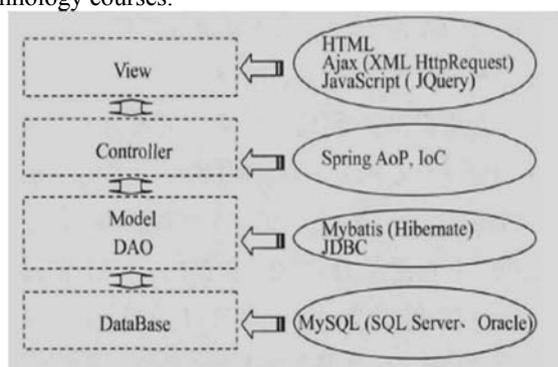
Picture 2. Spring MVC framework technology knowledge system

Based on PBL method, we constructed teacher team to solve problems in project team and adopted classic 7 step across implementation steps proposed by Schmidt [6]: 1st step, describe problem; 2nd step, define problem; 3rd step, analyze problem one, discuss and confirm relevant technical problem; 4th step, analyze problem 2, discuss and confirm principle, mechanism as well as contained subject knowledge; 5th step, confirm missing content, that is the curriculum system of learning; 6th step: self-learning and problem solving; 7th step, group discussion and results sharing. At present, based on software engineering thought, we let students make self-learning and solving problems of project technology starting from framework system, UI that is View system and Model business model, meanwhile, hold technology seminar at laboratory to make the learned knowledge of students apply to project research and development.

IV. EVALUATION OF EDUCATION QUALITY

Education quality evaluation mechanism maintains personnel, standard, procedure, method and other factors that composed of education quality evaluation activity into organic system in the form of system and organization etc. and then reach the purpose of evaluating the quality of education activity in a correct way. Construction of scientific quality evaluation mechanism can make real judgment for talent cultivation program, curriculum design, learning mode and other implementation situation, which is an important measurement [2] of ensuring normal operation of education

and improving education quality continuously. The traditional evaluation method of education quality for students is testing and all kinds of practical testing including comprehensive experimental evaluation method etc. The evaluation of education quality focuses on checking the cultivation quality of students, but the teachers and teaching environment and other factors can be ignored. Therefore, the monitoring index system of undergraduate teaching quality in colleges and universities in Zhejiang province has clarified 7 first level indexes and 20 second level indexes.

The proposed project teaching method changes traditional method focusing on textbook teaching and transfers it into learning method focusing on project and assisted by PBL; besides following the evaluation method of traditional testing, it puts more emphasis on project research and development process in the evaluation process and evaluate its ability of analyzing problem and solving problem through supervising practical activity. In project teaching mode integrating PBL, the teachers need to play various roles of managers, coordinators and participants etc well, make the students realize their responsibilities and function in the team, well control the evaluation standard and adopt multiple-angle evaluation method [6]. For the change of teaching mode mentioned in application-oriented talents cultivation, the teachers should pay more attention to the reform of curriculum system. The practice has shown that in the former application practice course, the course content for specific practice is relatively single with weak practicability. Participation of specific project research and development in enterprises can strengthen the project research and development experience of students, and also strengthen their understanding and master of theoretical knowledge system hidden behind PBL learning. Therefore, the evaluation of application-oriented talents teaching quality should run through the thought of "employment-oriented and competency-based", adapt to the needs of current social development actively and pay more attention to the evaluation of process.

Generally speaking, the cultivation of application-oriented talents should focus on the occupation, practicality and openness of teaching process, improve the professional quality of students through the research and development of specific project and determine the teaching process based on the mastering degree of students in realization method, realization technology, realization means and other skills. The teaching mode under PBL takes students as the actors and practitioners of teaching process, teachers are constructors for occupation-oriented curriculum system in teaching organization process, therefore, in the evaluation process of teaching quality, the teachers must pay attention to: ① evaluation of cultivation process; ② evaluation of practical ability; ③ evaluation of class teaching and practical teaching; ④ qualitative and quantitative evaluation; ⑤ evaluation of traditional test. The software major of colleges and universities adopts project teaching method integrating PBL, accomplishes transferring from theoretical teaching to practical gradually, improves the construction of course group, establishes joint laboratories with many enterprises,

researches and develops specific software system with enterprise demand-oriented and greatly improves the research and development skills of students. The quantity of graduates majored in software participated in software research and development has increased by 30% compared with last year and the average salary is higher than that of former graduates, which proves the significant teaching effect.

V.   CONCLUSION.

To carry out the newly education reform program in colleges and universities published by department of education, increase the ratio of cultivating skilled talents, many local undergraduate colleges and universities are making education reforms by taking the cultivation of application-oriented and high-quality talents as objective. The talents of software professional application are with strong engineering background, whose practice skills, teamwork and other professional qualities can only be improved by large amount of training at school, therefore, the students need to survey the problem in a comprehensively from the angle of project, solve problem quickly with PBL learning method and exercise teamwork spirits of independent thinking and cooperation; in addition, it is the purpose of proposing project teaching method integrating PBL of this paper to construct talent cultivation and evaluation mechanism meeting the practical requirements and cultivate more practical talents meeting the social requirements. It is hoped to provide reference to application-oriented talents with professional training and engineering background to make "transformation and upgrading".

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