

The Exploration and Practice of International Software Engineering Talent Training Mode

----A Case Study of Software College of Northeastern University*

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Abstract - In the process of fully integrating into the economic globalization, the shortage of international software personnel has become the important factor which restricts the development of domestic software industry, which requires the university to train software personnel with international competitiveness. In order to explore an effective mode of international software personnel training and to promote international software talents training process, this research done at the Software College of Northeastern University carries a deep explanation on the method of international software engineering personnel training, and putting forward the reform direction for some aspects such as talent training system, school-running mode and the internationalization of teachers.

Index Terms - international software talent, software engineering, talent training, school-running mode

1. Introduction

International talent reflects the person who has a global vision and the latest professional knowledge, can adapt to the cross-cultural communication, and solve the complex problem at the international level [1], and who can seize the opportunities and gain the initiative at the global platform. The development of economic globalization increases the demand for international talents, and also causes the global talent shortage thus causing talent contest in different fields. The impact and influence will inevitably reflect in the education sector. Internationalization of higher education arises at the historic moment, and becomes one of the development trends of the higher education in the new century. To train international talents has become an important task of higher education. During the 11 years since the setting up, Software College of Northeastern University has always taken training high-level international software talents who have spirit of the times and pioneering consciousness, and who can meet the needs of the age, as the sole goal of talent training. According to their own actual situation, in the practice of development, Software College gradually explores international talents training mode with industry characteristics, and forms a series of innovations both in theory and practice.

1. Setting up the Multi-level International Talent Training System

To establish an international talent training system, it requires learning the advanced experience from foreign universities, scientifically constructing the international course system, inputting and training student's ability of engineering practice and global competitiveness based on the requirement of enterprise, and effectively reducing the distance between software talents and the demand of international and domestic enterprises. Curriculum is the core content of training scheme, as well as the basic constituent element. The key to talent training is the internationalization of the curriculum. To train talented personnel who have international awareness and the ability to participate in international competition, the university must promote the internationalization of curriculum system in colleges and universities [2].

To construct scientific and reasonable international curriculum system, Software College of Northeastern University introduces 10 core courses of software engineering from Carnegie Mellon University, and meets the needs of international IT personnel training by absorbing the foreign advanced training mode. On the basis of understanding, digesting, and absorbing the introduced curriculum, Software College resets the curriculum system, and ensures the curriculum system is internationally compatible. Software College also sets up several fine courses with global IT companies, such as Microsoft, IBM, etc. A few of the specialized courses are taught by teachers from well-known foreign colleges and universities or lecturers from enterprises, which makes the course content keep up with the development of international software industry and technology. Under the premise of keeping the class group relatively stable, Software College actively strengthens the cooperation and communication with the universities in UK, Ireland, United States and other countries. In line with the needs of the developing global economy and information industry, Software College dynamically adjusts the courses and class hours, and updates teaching content. At present, 16 specialized

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courses of the international class (English) are all taught by foreign teachers in English.

2. Strengthening the Training of Foreign Language Capability

Foreign language capability is an important premise to train high-level international software talents. It is also an important evaluation item for enterprises to select and employ a person. The foreign language education in colleges and universities should break the existing college English teaching modes, and focus on promoting student's international communication ability, to adapt to the social demand for international talents.

Software College has adopted a series of measures to strengthen the foreign language education, such as: English graded teaching; uninterrupted English teaching for students during the period of school, setting up intensive English, IT professional English, TOEFL, and intercultural communication courses after CET-4, encouraging students to take a second foreign language course; encouraging students to participate in the international foreign language tests, for the student whose TOEFL and IELTS scores reach a certain level and passes the CET-4, he can exempt the subsequent English courses; for the student who has passed The Japanese-Language Proficiency Test (N2) and above level, he can apply for exemption of Japanese courses, and obtain corresponding credits. Students are encouraged to write graduation thesis and do the defense in English.

At present, the measures of strengthening foreign language teaching have produced results. The passing rate of CET-4 of Software College students ranks first in school year after year. The comparison is shown in Fig. 1.

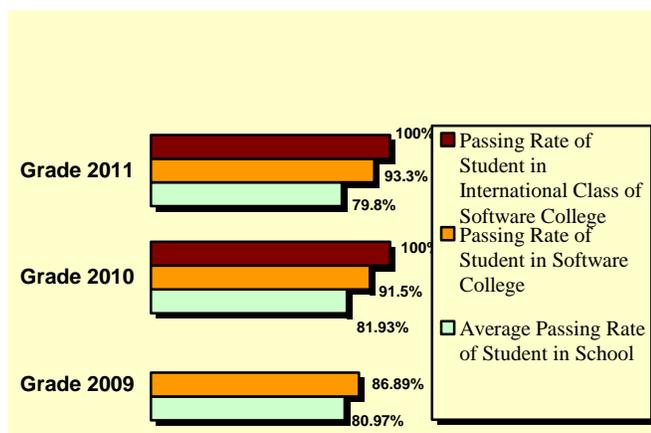


Fig. 1 The comparison of average passing rate of CET-4 between students in school and students in Software College

In addition, the number of students who participate in international foreign language tests also increases every year. In 2011, there were only 20 students participating in TOEFL, IELTS, JLPT and other international foreign language proficiency tests; in 2012, the number was 50; So far in 2013, the number is 220 (shown in Fig. 2).

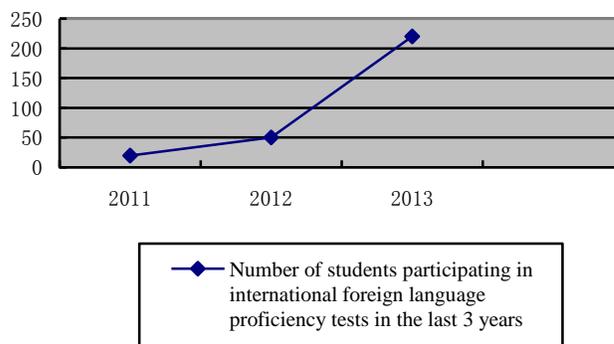


Fig. 2 Number of students participating in international foreign language proficiency tests in the last 3 years

3. Setting up International Classes with Unique Training Programs

With the development of social economy and the transformation of college talent training goal, many traditional class setting modes cannot adapt to the talents training in the new age, or the social demand for international talents. Colleges and universities need to carry out theoretical research and practical exploration on talent training modes with specific characteristics, build up international classes on the existing professional basis, and actively construct platform for student's international ability training. It needs to take the construction of international classes as a new direction of university personnel training, to adapt to the social demand for talents with professional skills and proficiency of foreign language in the new situation.

On how to train software talents who can meet the needs of international software industry, Software College of Northeastern University has actively explored and practiced based on their available resources, and set up international classes with unique training plan on the basis of common software engineering classes.

In 2005, Software College set up professional software engineer intensive Japanese class, arranged intensive Japanese courses and employed experts from IPEJ to carry out project practice for it, and provided overseas employment opportunities for outstanding students who were interested to work in Japan. So far, the college has held 8 admissions of it, successfully sent more than 80 graduate students to Japanese universities for further study or to work in well-known Japan IT companies. The college set up international class (English) of software engineering in 2010, and set up an international class (Japanese) of software engineering based on professional software engineer intensive Japanese class in 2011. These are all classes with unique training plans established on the basis of software engineering profession. International classes adopt curriculum systems in line with internationally well-known universities. 95% of the compulsory courses of international class (English) are taught by foreign teachers from well-known colleges and universities in English. International class

(Japanese) not only sets up English courses but also focuses on Japanese language education, adds more than 500 hours of intensive Japanese course, focusing on training student's ability of listening and speaking, which makes students pass CET-4 in the second semester of freshman year, reach the level of The Japanese-Language Proficiency Test (N2) in the second semester of sophomore year and have the ability to directly communicate with Japanese teachers.

4. Establishing Multi-mode International School-Running System

The advancement of economic globalization makes internationalization become a trend in the development of higher education. The highly centralized and unified mechanism of running, the closed operating system of training, and the simplex goal of talent training cannot meet the social demand for talents. Practice has proved that the exploration of internationalization of undergraduate education is a tendency and an important channel for colleges to improve the educational level [3]. International school-running mainly includes flexible type, integrative type, and grafting type. Flexible type means, hiring foreign teachers to give lessons, sending teachers abroad to learn from foreign experience how to teach, sending students to study or practice abroad for short-term, this ensures the teaching methods are internationally compatible; integrative type is to completely integrate our teaching mode with international cooperative schools' in the process of talent cultivation; grafting type means to fully maintain each other's own teaching modes. By the mutual recognition of each other school's credits, the student can obtain graduate certificate and degree certificate from both of the schools.

Over the years, international education of Software College develops from "flexible type" to "integrative type" then to the "grafting type". Through professional software engineer intensive Japanese class, international class (English) of software engineering, international class (Japanese) of software engineering, Software College establishes various school-running modes simultaneously, makes breakthroughs in the key areas, gathers experience, and spreads the effective practice in the college, which deepens the internationalization of the educational work.

At present, Software College has carried out 10 double bachelor degree cooperation projects, bachelor-master degree cooperation projects and double master degree cooperation projects with 9 well-known universities such as Loughborough University, University of Colorado at Boulder, University of Wollongong, Hosei University, etc. At the same time, the college also carries out medium-term and short-term student exchange programs with more than 20 universities in more than 10 countries and regions such as Ireland, Sweden, Japan, South Korea, Latvia, Taiwan and Hong Kong.

5. Enhancing International Teaching Capability of Faculty

Faculty is the most important human resource element in the development of higher education. The key to

internationalization of higher education is the internationalization of teachers. Internationalization of teachers is an important part of implementing the strategy of "strengthening country with talent" as well as the key to implement the strategy of "strengthening school with talent" in colleges and universities [4]. The process of internationalization of education is also the process of training a batch of teachers who can undertake international education tasks. Achieving internationalization of education largely depends on the degree of internationalization of teaching staff. Colleges should combine with the demand of development, introduce and train talents with target [5], should break the bondage of thoughts, be equipped with the international vision, actively learn from foreign experience of teaching, share global education resources, and try to make the teacher resources diversified and internationalized.

Software College upholds this idea, adheres to hiring foreign teachers to teach and do research work in short-term or long-term. For example, 16 specialized courses of international class (English) of software engineering are all taught by teachers from well-known universities in Britain, the United States, Ireland and other countries. Foreign teachers are encouraged to adopt various methods to teach. Software College attaches importance to their opinions and suggestions on teaching, adopts practical advices and puts them into practice.

Software College also pays great attention to training local teacher's English teaching ability. Firstly, it opens up a variety of channels to strengthen teacher's training abroad and trains a group of teachers with overseas study and scientific research experience. Secondly, each foreign teacher is equipped with an assistant teacher with strong English ability. The assistant teacher needs to fully participate in foreign teacher's teaching process, and is required to have all English teaching ability after 2-3 rounds of the assistance.

6. Encouraging Students to Participate in International Exchange Programs

It is generally acknowledged that the world is becoming increasingly international. Higher education and internationalization is a mutual process. This international complexity might add to the need of an improved understanding and of a wider acceptance of cultural diversity to some extent [6]. Promoting student international exchange is an important measure to train international talents with global vision and understanding of different cultures, to serve the country and the region, which has been paid attention to by all countries in the world [7]. "National Education Reform and Development of Long-term Planning Programs" clearly puts forward: to adapt to the requirement of social and economic opening to the outside world, it needs to train a batch of international talents with international vision, familiar with international rules and regulations, and who can participate in international affairs [8].

Software College has always attached great importance to student international exchange. Relying on international

exchange programs of the college, the college introduces various measures to support student learning abroad. In addition to providing outstanding students travel expenses, the college also actively applies for outstanding undergraduate international exchange projects of China Scholarship Council. At present, 3 projects are qualified; this year, the college will apply for 7 projects. In addition, the college also recognizes the credits students gained abroad. In recent years, the student international exchanges have made gratifying achievements. The number of students going abroad for exchange increases year after year. In 2010, the number of students who had participated in the international exchange programs is 15, and 31 graduates went abroad; The number was 27 and 31 respectively in 2011; 22 and 40 respectively in 2012; in 2013, it is 72 and 43. The growing trend of the number of international exchange students of Software College in recent years is shown in Fig. 3.

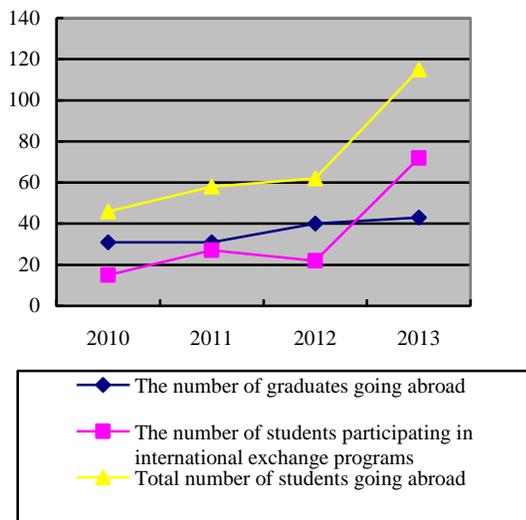


Fig. 3 Number of students and graduates going abroad from 2010 to 2013

To promote the international education, the college also invites students from UK, Japan and other foreign cooperative universities to visit every year. Since 2010, the college has invited 5 groups of foreign students, 36 people to the college. Sending students abroad and inviting foreign students for visit strengthened the communication between the students, broadened student’s international vision, and expanded influence of Software College abroad.

In short, economic globalization promoted the global competition. To enhance international competitiveness, it is important to train international talents. International software

engineering talent training is a new strategy to adapt in these times of development and international environment, also is a challenge we must face. Deng Xiaoping put forward as early as 1983: “education should face modernization, the world and the future” [9]. It profoundly reveals the essential characteristics and the nature of modern education, which has important guiding significance to international talents training. To train international software talents with competitiveness, it needs to stick to “three facings” thought, extensively carry out international exchanges and cooperation, reasonably and effectively introduce and use foreign high-quality education resources, which includes advanced educational idea, curriculum system and teaching methods, to integrate and innovate on the basis, keep implementing reforms of the education and teaching systems, and by conducting various forms of international education modes, to train a large number of international software talents for the economic construction and social development of our country.

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