Exploration of Mode of Software Service Outsourcing Talents Training Based on School-Enterprise Cooperation and Engineering Education

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Abstract
With the rapid development of international service outsourcing industry, the supply and demand uncoordinated problem between talent training modes and service outsourcing enterprises arises. In order to adapt to the knowledge-based economy and social development, our university has done some exploration work in IT service outsourcing talent training with some methods and measures taken, which the culture results obtained aims at providing a reference information for the high-quality IT service outsourcing personnel training and educational reform.

Keywords: School-enterprise cooperation, Engineering education, Service outsourcing, Talent training

1. Introduction

In recent years, with the rapid development of international service outsourcing industry, our country looks outsourcing as a strategic measure of economic development and gives it strong support. The service outsourcing is a kind of business model that enterprises separate the fundamental, common, non-core IT business from IT-based business processes, and outsource to a professional service supplier to complete. This make enterprises focus on core business development, so as to reduce costs, improve efficiency, and enhance their core competitiveness and resilience of the external environment, which include information technology outsourcing (ITO), business process outsourcing (BPO) and knowledge process outsourcing (KPO). However, China's service outsourcing industry has been severely restricted by talents bottlenecks. Knowledge System of software outsourcing talents remarkably lagged behind, mainly because the current training model and methods of universities can’t meet the current situation for talent demand (Wen & Xin, 2015). Therefore research of university talents training mode has become an urgent task of domestic industries and academic fields.

At present, IT technology development has progress quickly. The biggest contradiction between talent supply of service outsourcing and demand of IT software is IT service outsourcing talents trained in the current education system lack of practical skills, and has a big gap with an employing standard of many enterprises (Mohamad et al., 2014). If colleges and universities do not focus on training the talents adapt to the production development, trained talents will be difficult to meet the needs of business. Although some universities have already recognized the seriousness of this problem, situation still not changed

because of the lack of timely understanding of the needs of IT software and services outsourcing enterprises.

"Model of school-enterprise cooperation and engineering education talents training (MSECEET)" came into being in the current situation (Popescu, 2015). It is a drive mode of jointly cultivating software talents of the universities and services outsourcing enterprises. Its core is the solution to contradictions between school education and enterprise employing, prompting sufficient complementarity in the advantages of universities and enterprises from industry cooperation mechanism and operation mode. The comprehensive cooperation will be really achieved, which include scientific development of software personnel training program, organization of course plans according to the production process, and the establishment of training base in order to combine professional skills training and actual job requirements, so that personnel training quality may meet the needs of enterprises. So MSECEET not only provide high-quality talent pool for the development of service outsourcing enterprises, but also bring new opportunities to the featured education of the applied undergraduate colleges, as well as the inevitable trend to training and needs of talents (Massyrova et al., 2015).

2. MSECEET in Our University

The MSECEET advantage is so obvious and prominent that our government gave strong support to service outsourcing talent training plan. At this time, our college caught the opportunity and mode a deep reform on the IT service outsourcing talent training, which mainly took the following measures (Gillard et al., 2012).

2.1 Creating Training Base and Strengthening Practical Teaching

Our college established a developmental concept of "cooperative education, cooperative employment, cooperative development", and took various models of school-enterprise cooperation to achieve both profitable situation, to train advanced application-oriented talents for social needs. We have built some professional internship training bases, have signed some related agreements with Microsoft in Jiangsu (Wuxi), ChinaSoft International (Wuxi), Ambow Education (Kunshan), CVICSE (Kunshan), NanDa SOFTECH (Nanjing), Haichuang Digital Media (Wuxi), and so on. Meanwhile, the different professional training bases were also established which included Software Engineering, Network Engineering, Digital Media Technology. And the talent plan applying "3 + 1" training model was implemented based on the concept of “cooperative education, co-build, co-culture" with these enterprises. The co-build professions are as follows (see Table 1).

Table 1 The co-build profession list of school-enterprise cooperation model to build

Company Name	Cooperative period	Cooperative profession	Cooperative class
Microsoft in Jiangsu (Wuxi, China)	2013/09	Computer Science and Technology	Class Two, Grade 2011

Microsoft in Jiangsu (Wuxi, China)	2014/09	Computer Science and Technology	Class Two and Three, Grade 12
Ambow Education (Kunshan, China)	2014/09	Network Engineering	Class Four and Five, Grade 12
CVICSE (Kunshan, China)	2015/09	Software Engineering	Class Six and Seven, Grade 12
NanDa SOFTECH (Nanjing, China)	2015/09	Computer Science and Technology	Class one and Two, Grade 13
Ambow Education (Kunshan, China)	2015/09	Network Engineering	Class Three and Four, Grade 13
CVICSE (Kunshan, China)	2015/09	Software Engineering	Class Five andSix, Grade 13
ChinaSoft International (Wuxi, China)	2015/09	Software Engineering	Class Seven and Eight, Grade 13
Haichuang Digital Media (Wuxi, China)	2015/09	Digital Media Technology	Class Nine and Ten, Grade 13

2.2 Innovative Teaching System & Creating Feature Education

Since an original experimental teaching system is single, fuzzy hierarchic, and individualized culture can't be achieved, an integrated experimental teaching system of "three-dimension, four-level" structure was established according to professional training goals, providing support for different professional talent training, where "three-dimension" means experimental innovation capacity, experimental training level and experimental course content, and the "four-level" refers to the basic training level, the higher training level, comprehensive training level and technological innovation level. Experimental innovation capacity is the main line of "four-dimensional" system. The experimental training level is a ladder to enhance students' practical ability. Experiment course content is the key to achieve the level of experimental training levels. This system is conducive to improving students' practical abilities, to cultivating students' innovative consciousness and innovative ability, and to cultivating students' independent abilities (Wen & Xin, 2015).

Our college mainly rely on the quality resources such as "Jiangsu provincial international service outsourcing training base" and "Experimental Demonstration Center in Jiangsu Province" to establish "international service outsourcing talent training and project R & D base", and to further strengthen the training of talents for "professional international service outsourcing", and practice many aspects activities including software project management, software project testing, new technology training, etc. These may promote individuality employment orientation and ability, construct featured talent training modes. Our college has modified various professional teaching systems for four professions, network engineering, computer science and technology, software engineering and digital media according to their different professional training objectives. The implement of "three-dimension, four-level" of

experimental teaching system integration from Network Engineering profession was as an example listed in Table 2.

Table 2 The “three-dimension, four-level" of experimental teaching system of Network Engineering profession

Training levels	**Practical courses or projects**				
	Training				expanding
Innovation & entrepreneurship	Students practice and innovation training program, Network cabling skills competitions, Web-based application system project, Network security and management services, Network engineering and technical services.				Advanced technology practice of network programming, Professional skills training, Network systems integration projects
Comprehensive training	Network Planning and Design	Design of network security, network cabling training	Network engineering training	Graduation Project	
Enhanced training	Curriculum design of algorithms and data structures	Curriculum design of Web program	Curriculum design of routing and switching	Curriculum design of Network system integration	Design and Implementation of Web application system
Basic training	Programming foundation experiment, Object-oriented program experiment, Algorithms and Data Structures Experiment	Routing and Switching practice, Practice of Computer Network Security	Web programming practices, Linux Network Program Practices	TCP / IP protocol analysis and application of practice, Network systems integration practice	Algorithm design and implementation; TCP / IP protocol applications

2.3 Changing Teaching Mode & Deepening Teaching Reform

Teaching model is directly related to student learning, training work and innovation, t also related to achievement of the ultimate goal of education and teaching. Taking into account the business demand for talents, the development of training plans was targeted students' knowledge hierarchy in professional courses teaching. According to the training goals, the training plans were optimized and adjusted in

limited teaching hours, avoiding touch with theoretical courses or repeated teaching, adjusting the allocated proportion of classroom teaching and practical teaching hours, and properly handling the relationship between the practice courses and the curriculum trained by corporation.

In the teaching process, a combination of teaching model of classroom teaching and teaching outside by the enterprise is applied. Classroom teaching implements strict teaching management. With the premise of ensuring the professional courses, professional courses are increasing to improve students' practical and innovative ability on their own profession. The latest professional courses are completed by experienced engineers or project managers assigned by the business. Meanwhile the professional lectures in our college also track the teaching schedule. On the one hand, so that our teachers always study for long-term with enterprises' teachers to enhance teachers' levels, on the other hand, our teachers may guide teachers from enterprises to ensure the teaching quality (Dordinejad & Rashvand, 2014).

"Extracurricular teaching" can guide the students' career education to participate the professional community activities, which are managed by professional teachers, which provide weekly the forefront professional lectures, and assign tasks to be finished by students through online access to information, discussion and research and so on. The training process of students' knowledge and skills are shown in Figure 1.

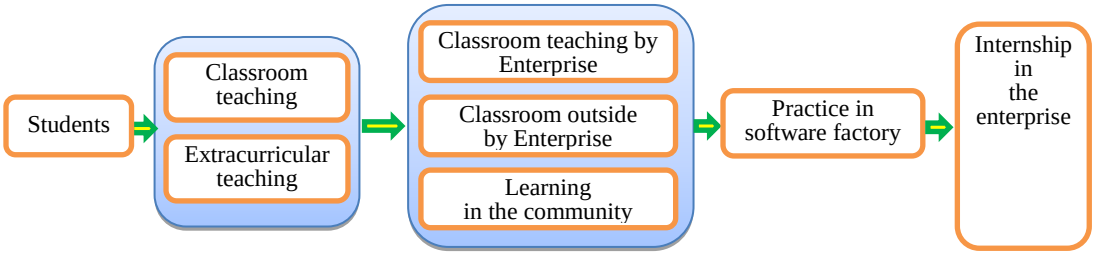

Figure 1 training process of students' knowledge and skills.

2.4 Deepening Management Reform & Highlighting Training Features

Over the years, our college has been training applied-type graduates as purpose, and keeping up with the current social needs in a professional setting. So far, we need to break the traditional training model which has long been formed. The model "multi-class, multi-practice, multi-management" is to be reflected in the training process. The appropriate teaching methods to our students are to be used. We should vigorously promote the development and use teaching material in line with the culture purposes in our school.

In addition to cooperation teaching with the corresponding professional IT enterprise, the communities are managed by various professions. The specific settings of societies are shown in Table 3.

Table 3 The specific settings of Community

Community names	**Professions**	**management and learning methods**
Network Association	Network Engineering	The associations mainly guided by professional teachers. The key members are composed of the first, second and third grade students. The third grade students as a technical backbone may help the first and second students in learning.
Software Association	Software Engineering	
Digital Media Association	Digital Media technology	
Application and Simulation Association	Computer Science and Technology	

3. Reform Results

3.1 Stimulating Students' Interest in Learning & Improving Their Professional Skills

In recent years, personnel training mode of "school-enterprise cooperation and engineering education" is used in our college. In this way, the theory and practice is closely associated with the actual development of enterprises to greatly stimulate the students' enthusiasm and initiative. Main features have (1) the increasing number of participants every year, the degree of perfection of the project and the quality of the documentation prepared are improved significantly; (2) since cooperation with Microsoft, 113 applications successfully submitted to windows 8 App Store by the students in just 20 days; the ability of students to be approved by Microsoft technology experts in "Microsoft Imagine Cup 2013 competition in China Imagine Cap".

3.2 Improving Employment Rate of Students and Employment Level

The graduates experienced the "School-Enterprise Cooperation and Engineering Education Personnel Training Mode" have showed obvious features: (1) employment: With excellent professional skills, complete project experience and qualified professionalism, 16% of participants were hired by IBM, 15% of participants were hired in INFOSYS company, 12% were hired in NandaSoft Fu Yue Technology Co., Ltd., other practitioners work in Bardon (Suzhou, China), Hongzhikeji (Suzhou, China). Their work ability and overall quality of graduates are gave a good compliment by corporate employers. (2) Awards: In the following compititions, "Jiangsu province Undergraduate Mathematical Contest in Modeling," "Chinese Students' outsourcing Competition", and "2013 Microsoft Imagine Cup competition Imagine Cap in China," competition results come out top, which has practical guidance to educational reform in our college.

4. Conclusion

MSECEET not only provides high-quality talent pool for the development of service outsourcing enterprises, but also points out the direction of development to our featured teaching, which is an

inevitable trend to personnel training in today's knowledge society. Meanwhile, when we learn, absorb, practice and develop the new mode of education, we should keep a clear mind to discover the problems, and learn from the advanced teaching experience abroad to improve education system for further development of service outsourcing personnel training in the school.

Conflict of Interest

All authors declare no financial/commercial conflicts of interest.

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