

Higher Vocational IT Service Outsourcing Personnel Training Course System Architecture in School-Enterprise Integration Mode

FangYuYan, MaoJie

(1. Jiaxing Vocational Technical College, Information technology branch, ZheJiang Jiaxing 100039, China)

Abstract

Along with the Internet development, efficient IT services is of great significance for the development of national economy. Our country also pays more and more attention to the cultivation of IT services personnel. Traditional higher vocational IT service outsourcing can't meet the requirements of continuous developing IT service outsourcing field. So this paper puts forward school-enterprise integration course system to train higher vocational IT service personnel through school-enterprise cooperation mode. School and enterprise jointly formulate training program and introduce term project and virtual enterprise. Experimental results show that the proposed school-enterprise integration higher vocational IT service outsourcing personnel training mode greatly enhances the students' learning efficiency and practical learning efficiency of professional knowledge and achieved satisfactory results.

Keywords: *IT Service; Outsourcing Talents; School-Enterprise Integration; Course System*

1. Introduction

Along with the continuous development of our country's economy and Internet technology, the corresponding IT services are widely used in enterprise production and people's life, national defense military, and medical education, etc. High quality IT services[1~7] can promote the development of related fields and has vital significance. So our country gradually pays more attention to the cultivation of IT service outsourcing personnel and spends a lot of manpower, material resources and financial resources. The traditional higher vocational IT service outsourcing personnel training model mainly uses one-to-one classroom teaching[8~11], and can't effectively train students' practical ability with market demand orientation, resulting in students' low practical learning ability. It can't adapt to the changing market demand. It not only affects students' employment situation, and reduces the overall strength of IT service outsourcing field in China[12~17].

At present, IT specialty in higher vocational colleges is one of the key professional open widely in recent years, IT professional graduates employment outlook is not optimistic, produce the social need a lot of IT talents, but IT graduates can't find work awkward situation, the main reason is the cultivation pattern of universities is not standard. Comprehensive analysis of China's IT talents structure can be found that China's social needed IT talents mainly includes hardware and software system development, the organization system of the researchers, is engaged in the software design of the senior talents, and elementary programmers. The first two types of talent need to have a full IT theory knowledge and related enterprise practical experience.

According to the related data, the current China IT services industry has gradually into the rapid development and mature stage, in the support service market and professional services to promote the expansion of business, China IT services market scale is significantly higher than the total amount of hardware and software market growth. Along with the domestic IT services high-speed growth, IT outsourcing services to meet the needs of the IT outsourcing services industry has become the key direction. How to quickly get to meet the demand of the enterprises standard talents become IT service outsourcing enterprises the most important strategic goal. Because the traditional IT service outsourcing talents mechanism between enterprises with relative made, no good echo, schools and enterprises without good between the talent demand and cultivate interaction process. Make the school develop IT service outsourcing talents with practical enterprise demand phase out. Should be to develop students' professional skills and practical operation skills of combining ability for the IT service outsourcing talents training target. IT service outsourcing school should reform IT related

professional curriculum system structure, according to the enterprise IT service outsourcing process and criterion to construct the corresponding learning areas.

So this paper puts forward higher vocational IT service outsourcing personnel training course system with school-enterprise integration [18~23]. Based on comprehensive analysis of market and social demand, this system makes full use of school and enterprise, two different types of education environment and resources, creates higher vocational IT service outsourcing personnel training course system based on market demand through traditional classroom teaching and enterprise's practice teaching. The experimental results show that the proposed higher vocational IT service outsourcing personnel training mode with school-enterprise integration greatly enhances students' professional knowledge learning efficiency and practical learning efficiency and achieves satisfactory results[24~31].

2. Higher vocational IT service outsourcing personnel training problems

The demand proportion for IT service outsourcing personnel is bigger and bigger, but the existing university personnel training is seriously disjointed with enterprise employing standard. IT service outsourcing enterprises usually input a lot of manpower, material and financial resources to the related personnel training in order to satisfy their own talents demand, but in a short time they can't receive satisfactory results. A large number of students majoring IT outsourcing services graduate from universities every year. After graduation, however, students face employment difficulties or get jobs irrelevant to their major. The main reasons are the following:

(1) Theory is broken away from practice. Students' practical ability training has not got enough attention.

The teachers in higher vocational colleges are lack of practical work experience with only higher theoretical knowledge teaching ability. They don't understand enterprises' demand of personnels and IT industry technology's practice situation. What they teach are mainly stiff cases or some reference material. They cannot teach students the knowledge and skills that enterprises require according to the changing market development needs. After graduation, students can't adapt to the requirements of relevant enterprises, then employment difficult problem appears.

(2) Students weak foundation

Most higher vocational students haven't form good learning habits and methods in the learning process in the past, so they could not adapt to the current course study. Especially while learning computer software professional course, the students may have strong aversion against programming because their mathematics and English foundation is weak and therefore cannot fully understand the theory knowledge and affect students' development in actual work.

(3) Lack of cooperation between school and enterprises

Currently the school-enterprise integration system of mutual cooperation and development between higher vocational colleges and enterprises haven't been established, and still need further improvement. Higher vocational colleges lack cooperation with enterprises, which leads to the lack of opportunities that students can directly involved in the work. This greatly affects the students' overall abilities' training.

3.IT service outsourcing personnel should have higher knowledge accomplishment

Service outsourcing industry is modern service industry of intensive intellectual talents which asks which is of high quality requirement and huge demand. As an important personnel cultivation and training base, higher vocational colleges in China should play an important role in the process of service outsourcing development. Provide information technology outsourcing (ITO) and business process outsourcing (BPO) through service outsourcing including service outsourcing enterprises. Information technology outsourcing (ITO) includes basic technical service such as technology research and development, software development and design, and system operation services and system application service, etc. Business process outsourcing (BPO) includes enterprise internal management service, enterprise business operation service, and supply chain management services, etc. They are service outsourcings based on IT technology, so in the cultivation of IT personnel demand, higher

vocational colleges should analyze the demands of service outsourcing enterprises, and give specific practical personnel training. According to the employing standard of IT service outsourcing enterprises, IT outsourcing services personnel should not only master relevant development technology, software process standard, the practice and development ability of the project, but also has strong language and communication skills, understanding ability of the relevant industry business knowledge, good professional quality and team cooperation spirit.

4. Course system architecture of school-enterprise integration higher vocational IT service outsourcing personnel training

School-enterprise integration higher vocational IT service outsourcing personnel training mode refers to the overall integration of respective advantages of schools and enterprises in IT service outsourcing personnel training, break traditional schools' degree education and training base, overcome enterprise training defects, and construct " self-centered cooperative win-win school-enterprise cooperation mechanism".

4.1 School and enterprise jointly establish training program

In order to cultivate personnel meeting IT service outsourcing industry needs, integrate the market demand with higher vocational colleges resources. Higher vocational colleges and enterprise scholars jointly plan reasonable training strategy, participate in practice training and professional course teaching, and finally complete School-enterprise integration training model.

Higher vocational colleges discuss with enterprises and plan training target, relevant requirements, the knowledge and skills for students to master of School-enterprise integration training system, and at the same time ensure that the curriculum setting meets teaching rules of higher vocational IT service personnel and has strong relevance with demand of the enterprises. Higher vocational colleges sign a cooperation agreement with the enterprises. The enterprises send experts to carry on the practice teaching for the student, guide students' production practice and graduation design, and provide students with visit and internship opportunities.

The gap content between specialized fundamental course and specialized course and the market demands should be bridged by using the current mainstream industry technology course, professional development courses setting IT service industry standard, IT service outsourcing industry knowledge and professional quality courses. Curriculum practice, term project practice, enterprise training, enterprise practice and graduation design should be arranged in the practice process. And arrange IT service outsourcing enterprises experts as part-time teachers to teach specialized knowledge and practical training of the project in the training system.

4.2 Teaching practice system constructed by term project

Higher vocational colleges jointly study with IT service outsourcing enterprises to determine the course arrangement of students' overall learning process. Set graduation design be in the last semester, and arrange other courses to be orderly balanced in different terms, and ensure a comprehensive knowledge system each semester, including a main course and other related programs, and ultimately build term plan associated with the actual IT service outsourcing enterprises.

In different term planning process, students can master specific standard, professional knowledge and professional quality, etc of IT service outsourcing industry and have the knowledge accomplishment required in work process of IT service outsourcing enterprise. Term plan's related courses mainly include the semester courses and courses in past terms. The planning of the teaching content should attach importance to the study of students' learning stage and connectivity, and in connection with the related process, teachers should discuss with professional personnel of IT service outsourcing enterprises.

4.3 Introduce virtual enterprise laboratory to the classroom

In the process of introducing virtual enterprise environment into teaching, let students feel IT service outsourcing enterprise's actual working environment and deepen the students' understanding of knowledge, ability and the specific requirements and professional accomplishment of the actual work that IT service outsourcing industry required. Therefore higher vocational colleges with enterprises jointly plan virtual teaching environment, simulate the actual working environment, arrange related personnel by enterprise to guide establishing personnel management structure, and comprehensively evaluate students according to their actual study effect in term process.

Virtual enterprise laboratory can be set according to the concrete practice enterprise, and let students' vision and feeling match practice working environment. This laboratory manages students through the file server in project learning. Students are required to hold the relevant documents to enter the virtual enterprise laboratory. Laboratory's operation time is enterprise's working hours. Professional staff sent by the enterprise will take work task and the related projects in the enterprise as training content of students learning, meanwhile take subject director as the chairman, the teacher as enterprise manager, monitor as enterprise's project manager, each student as a member in a specific project of the enterprise. Project manager and the manager may assess and evaluate their members' work.

4.4 Arrange teaching of school-enterprise interaction, work-integrated learning

Adjust the traditional mechanical teaching method, reasonably plan theory teaching and practice teaching content on the basis of personnel training strategy and the actual market demand. Plan teaching with "diplomema". Train the students' professional skills based on the learning content, ensure theory teaching corresponds to basic skill training. Based on the practice learning content outside school, integrate theoretical study and practice teaching. Ensure the consistency of teaching content, study progress and actual work process.

4.5 School-enterprise two-way participation in teaching

Higher vocational colleges jointly participate with relevant enterprises in curriculum setting, resources construction, practice guidance, practice base construction and management, and students' employment personnel training process to ensure personnel training matching the enterprise's actual demand. Higher vocational colleges should constantly adjust their teaching system, strengthen the practicality, open quality, and expertise of teaching process and ensure that professional talent training process is in cooperation with students' employment.

4.6 with teaching practice process closely to train students' ability of time

(1) improve the practical ability training in the ratio of overall talent cultivation system, we should pay attention to the practice teaching process, increase students' practical ability training proportion. Theory should be ChengTong training course to the proportion of 1:1.

(2) to intensify the development of students' practice teaching base in practical teaching, and the enterprises and institutions to develop training base, the section can adopt in the practice teaching base, realize the teaching and practice closely. And according to the students' practical learning situation, in the enterprise sent under the guidance of professional personnel, to construct the students give priority to practice group, with the value of the simulation development and practice subject of study, improve the students' practical ability. The classroom teaching with practice link combination, vigorously improve assessment method evaluation aim is for students' knowledge, skills and abilities, and establish a comprehensive assessment assessment students practical ability as the leading thought of appraisal system, reduce the specialized course of theoretical examination content, strengthen the students' practical ability and independent ability to complete the project evaluation. From the traditional way of examination question paper gradually transition to the assessment of students' practical ability appraisal of force to explore suitable for higher vocational students' evaluation system and evaluation method.

4.7 Construct teaching staff of double quality structure and full-time, part-time combination

Take the teaching requirements in accord with cultivating personnel training target as the key objective of teaching staff construction. School arranges teachers to be trained in campus base. Ask them to participate in relevant scientific research, and form practice mechanism for teachers to work in enterprises. Each teacher is required to work at least three months every year in enterprises. Teachers are asked to get out of school and work in enterprises so as to strengthen the contact with enterprises' experts and technology scholars. See enterprises as the extension of classroom teaching, enhance their practice ability, and strive to become the real double-qualified teachers. And then enhance teachers' practice teaching ability and management skill, absorb high-quality talents, optimize the teaching staff structure, and enhance the overall quality of teachers' team, build a double-qualified teaching staff with both profound theoretical basis and rich practical experience. Hire professional talents of enterprises as class teachers of practice skill and ability, and ask them to give lectures, etc. to improve practice teaching's level and pertinence.

4.8 Double appraisal of school and enterprise (social)

Foundation and subsidiary course assessment gives priority to technology and skilled content. Through fusion method of daily test and final exam phase, assess students' learning situation. Based on the core professional course of the term set, students' professional skills are analyzed, and run evaluation skills throughout the whole process of semester teaching. After students getting into the enterprise to practice, the school should assess their professional skill appraisal, and present corresponding professional skill level certificate (qualification) to students, and ultimately students can get graduation certificate. Ensure the blend of theory with practice in personnel training process and the combination of classroom teaching with practical training content. The students' practical ability evaluation shall be done jointly by the school and the enterprise.

4.9 School-enterprise integration still need to pay attention to the cooperation with the government

In order to improve the efficiency and stability of the cooperation between colleges and enterprises, the school should actively strive for the support of the government. The government needs to formulate relevant policies or regulations and measures to help and promote the smooth progress of the cooperation between school and enterprise. The government should request the enterprise or industry to have obligations and responsibilities to participate in vocational and technical education, and give corresponding incentive policy.

4.10 Integration of teaching management and quality control

Comprehensively monitor and analyze factors influencing the teaching quality, and strengthen teachers and school management personnel's overall quality management. Combine the goal control and process control to manage and control the quality of teaching process at all levels. And establish "third party test (trial) nuclear" mechanism for teaching quality. Based on their own teaching evaluation system, schools, enterprises, government agencies, and students together participate in the teaching quality assessment with the integration of enterprise management system and the relevant requirements. Gradually complete the teaching quality supervision and security system in which schools are the main body. Education administrative department gives guides and society participates in.

5. Experimental verification

In order to validate the effectiveness of this paper's design school-enterprise integration course system, fifty students majoring in professional IT service outsourcing from a vocational school are taken as experimental subjects. Statistic analysis of their one term's study was done. These students are

asked to fill learning questionnaire. And conversation is carried on to understand the students' study after adopting course system method proposed in this paper. Finally, students' overall learning efficiency, professional knowledge learning efficiency and practical learning efficiency are respectively got in Figure 1, Figure 2 and Figure 3.

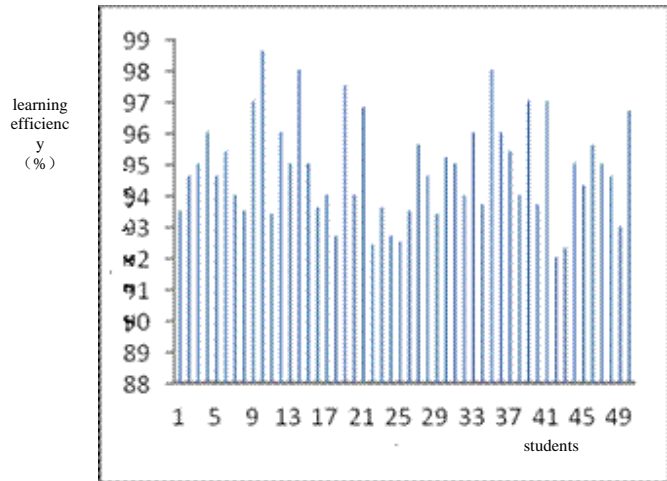


Figure 1 Students' learning efficiency in school-enterprise integration mode

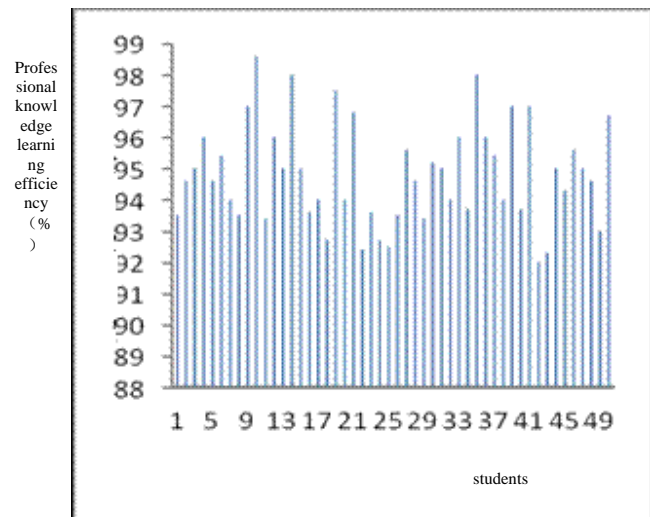


Figure 2 Students' learning efficiency in school-enterprise integration mode

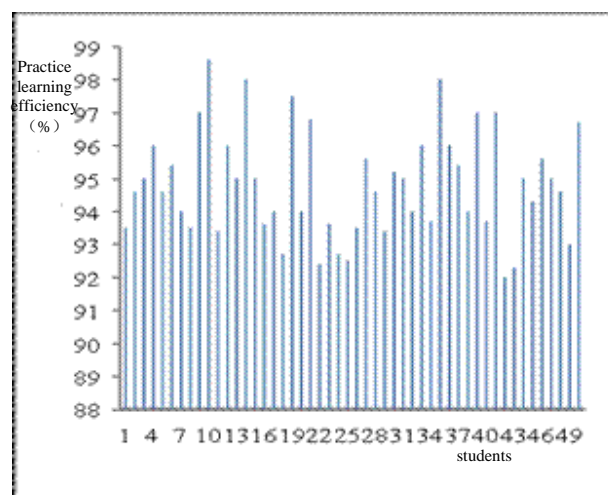


Figure 3 Students' practical learning efficiency in school-enterprise integration mode

Form Figure 1, it can be seen that by training specialized knowledge learning ability and practice ability of higher vocational IT service outsourcing talents by adopting school-enterprise integration training course system. Tracking students' learning status, students' overall learning efficiency is basically between 92% and 96%, which indicates that students' overall abilities have reached higher level. The students' professional knowledge learning efficiency is between 92.6% and 95.8%, which indicates that the students, in this paper's school-enterprise integration training mode, can effectively grasp professional knowledge learned. The students' practical learning efficiency is between 92.5% and 96%, which indicates that students have strong practice learning ability, and can make full use of this paper's school-enterprise integration training system and grasp the related practice training courses. Students' comprehensive ability has greatly increased.

With the above experiments, the higher vocational IT service outsourcing personnel training course system architecture in school-enterprise integration mode designed in this paper has greatly enhanced the students' professional knowledge learning ability and practical learning ability and achieved satisfactory results.

6. Conclusion

In order to meet IT service outsourcing industry requirements for talented personnel, this paper combines the resources of higher vocational colleges and enterprises, two teaching environment and resources, and constructs school-enterprise integration personnel training mode. The mode greatly improves the students' professional knowledge learning efficiency and practical learning efficiency. Students can study and practice according to enterprise staff's working condition. This makes the students have profound understanding of actual working environment, reduces the gap between the school personnel training and social practice demand, and realizes the perfect combination of the training in higher vocational colleges with the demand of IT service outsourcing industry. And the mode optimizes the traditional personnel training system mode, meets the market demand, and is conducive to solve students' employment difficulty problem.

7. Acknowledgment

Subject Sources: Science Technology Project of Zhejiang Province
Project No: 2012R30038

8. References

- [1] Gu Wangjing. China's software outsourcing industry scale and personnel pain [N]. Beijing Commercial Daily Newspaper, 2007- 01- 18.
- [2] liu Zhong. problems and countermeasures of our country's enterprise undertaking international service outsourcing [J].Journal of Research and Exploration, 2006, (4).
- [3] Zheng Hongfei, Ren Rongming. Offshore outsourcing services and countermeasures of China [J]. Shanghai: Shanghai Management Science, 2005, (2).
- [4] Qiu Yuan. A thought on present higher vocational colleges' "school-enterprise cooperation" [J].Journal of Vocational Education, 2008, (8).
- [5] Yuan Dingming. School-enterprise cooperation form analysis [J]. Education and Vocation, 2008, (2).
- [6] Xu Yan. "Teaching, studying, acting" integration of higher vocational teaching mode constructing [J]. Liaoning Higher Vocational Journal, 2011, (10)
- [7] Yao Kairong. The practice and exploration of software technology major built with school-enterprise cooperation. Software Guide [J]., 2012, 11(1) : 198.
- [8] Liu LiangHua, Zhao Jun, Xu JiHui, Zhao LiMing. Higher vocational talents training pattern practice based on the project team mentorship [J]. Chinese Science and Technology, 2011, (4).
- [9] Zhao LiMing, Zhao Jun, Ren GuoCan. Research and practice of "2 + 1" school-enterprise cooperation higher vocational talents training mode [J]. Journal of Henan Vocational Teachers College, 2008 (1).
- [10] James E.Pitkow, Summary of www characterizations, In: Severth International World Wide Web Conference,1998
- [11] J.Hnaand M.Kanlb.er DataMining ConcPestnad Tehcniques.Mogrna Kuanfiann,2000.
- [12] Anddrei Broder,Ravi Kumar,Farzin Maghoul,Prbhakar Raghavan, Srihdar Rajagopalan,Raymie Stata,Andrew Tomkins,and Janet Wiener Grpah structure in the web.In Proceedings of 9th Internatinal Conference on the World Wide Web.ACM Press,2001.
- [13] Lawrence Page,Sergey Brin,Rajeev Motwani,and Terry Winograd.The pagerank citation ranking:Bringing order to the web. Technical report, Stanford Digital Library Technologies Project, 1998.
- [14] JonM.Kleinberg. Authoritative sources in a hyperlinked environment[J]. 46(5): 604-632 ,1999.
- [15] J.Han, J.pei. ect. Frequent pattern projected sequential pattern mining. In Proc.2000, Int.Conf. Knowledge Discovery and Data Mining[J](KDD),Boston, MA, Aug.2000:45-50.
- [16] Z.Michalewicz Genetic algorithms + data structures = evolution programs,3rd edition,New York:springer-verlag,1996
- [17] Chen M S, Park J S, Yu P S.Data mining for path traversal pattems in a Web environment. In:proceedings of the 16#Int'l Conf on Distributed Computing Systems, Hong Kong, 1996.385-392
- [18] R.S.Michalski,Lbratko,and M.Kubat.Machine Learning and Data Mining Methods and Applications.Chichester:John Wiley&Sons Publisher,1998:223-240
- [19] Ming Syan Chen, Jiawei Han, and Philip S.Yu.Data Minging:An Overview from a Database Perspective.IEEE Transactions On Knowledge And Data Engineering[J] ,1996(8):866-883
- [20] B.Mobasher.Web Usage Mining and Personalization.Draft Chapter in Practical Handbook of Internet Computing Munindar P.Singh(ed.), CRC Press, To appear in 2004.
- [21] Tan Yihong, Li Xueyong, Chen Zhiping. Application of Mining Assoeiation Rules in Web Information Retrieval System[J]. Computer Engineering. 2006, 32(9):57-59
- [22] Lehmann T M, Gonner C, Spitzer K.Survey: Interpolation methods in Medical image processing[J].IEEE Trans, Medical Imaging,1999,18(11):1049-1075.
- [23] Keys R G. Cubic convolution interpolation for digital image processing[J].IEEE Trans, Acoust, Speech, Signal Processing, 1981, 29(6):1153-1160.

- [24] Hou H S, Andrews H C. Cubic splines for image interpolation and digital filtering[J].IEEE Trans, Acoust, Speech,SignalProcessing,1978,26(6):508-517.
- [25] Parker J A,Kenyon R V, Troxel D E. Comparison of Interpolating Methods for image
- [26] resampling[J].IEEE Trans,Medical. Image vol.MI-2,1983.
- [27] Vaidyanathan P P, Nguyen T Q. Eigen filters:A new approach to least square FIR filter design
- [28] and applications including Nyquist filters[J].IEEE Trans,1987(9):219-310.
- [29] Chan S C, Ho K L, Kok C W. Interpolation of 2-D signal by subsequence FFT[J].IEEE Trans, Circuits and Systems,1993,40(2):115-118.
- [30] Orantara S,Nguyen T.,m-th band filter design based on cosine modulation[J].In Proc.ISCAS,1998.
- [31] Maelland E.On the comparison of interpolation methods, IEEE Trans[J].Medical image,1988,vol.MI-7,pp:213-217.