

Strategic Version on the Development of 2nd-type Specialty Services Science and Enterprise Informationization in HIT^{*}

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Abstract Along with service-based economy has been the domination all over the world, it is necessary for universities to establish a corresponding discipline and specialty on services science to train college graduates with service-related skills and knowledge to facilitate the development of service economy in China. This paper briefly introduces the strategic version on the development of 2nd-type specialty named “Services Science and Enterprise Informationization” in School of Software, Harbin Institute of Technology, including the specialty's objectives and basic development ideas, education framework, expected results, etc.

Key words services sciences; enterprise informationization; 2nd-type specialty; strategic version

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1 Background

With rapid development of information technology, the world economy is undergoing tremendous changes. As the pace of informationization has increased in enterprises, a new modern service industry is emerging with knowledge and technology intensive services, such as finance services, IT services, and various specialty domain services^[1]. Driven by advanced information technologies, enterprise informationization will have a profound positive impact on productivity and competitiveness^[2]. Under this economic environment, a new discipline, service science, has risen and aroused considerable attentions and interests in both academia and industry^[3].

With an insightful vision, central government of China has proposed: “to accelerate evolution of industrialization with the power of informationization”, the considerable attentions are focused on development of modern services and enterprise informationization.

To accelerate the healthy transformation of traditional service industry, it demands a considerable amount of knowledge and technology intensive workforce. Whereas, serious lack of well-trained workforce has dragged the current development in China. Under this atmosphere with solid foundation in specialty of software engineering accumulated from past five years, School of Software in HIT proposes a 2nd-type special-

ty service science and enterprise informationization.

The focus of this paper is on the strategic approach of establishing the 2nd-type specialty in HIT, which is organized in 5 sections. Following the 1st section of introduction, the 2nd section states the objectives and ideas for establishing this specialty. The 3rd section gives the detailed plans on course system, teaching and evaluating approaches, etc. The predictable results are listed in the 4th section, and finally come with conclusion.

2 Objectives and Ideas

2.1 Objectives

To meet the demands of developing modern service industry and constructing IT-intensive economy in China, the 2nd-type specialty “service science and enterprise information” of HIT was proposed with enterprise information technology, IT consulting service, software project management, and modern enterprise management as main focuses. The purpose of establishing this specialty is to build a new discipline, which centered with modern service and enterprise informationization, integrated with multidiscipline knowledge from computer science, management, economics, psychology, law, and so on. This great effort is to improve our international competitiveness in modern service economy by accelerating the enterprise operation model upgrade and management method optimization. Through collaboration with international enterprises and research

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institutes the specialty is designed with emphasis not only on knowledge acquisition but more importantly on training student be more competitive in international environment. Ideally, based on current solid foundation, after four years evolution the specialty will become the lead in nation and be well known abroad.

2.2 Main Ideas

(1) Since the practice-oriented characteristic, individualization and gradual industrialization are important features of this specialty/system, it should be established through extended and in-depth collaboration with IT services and enterprise management consulting firms worldwide.

(2) To keep up with the pace of rapid development of information technology in modern service industry and enterprise informationization, it is necessary to import first rank textbooks and course materials into the specialty/system as well as to promote bilingual teaching.

(3) A composite teaching team should be built to engage teachers with different industrial backgrounds. With the flexible hiring system industry specialists are encouraged to become part time teachers and bring social experiences into class room, meanwhile full time scholars are able to enrich their practice-oriented experiences through extensive collaboration with industry.

(4) As part of education system the practice-oriented training program are highly emphasized with strict requirement of no less 10 months internship in enterprise for each graduates. In order to achieve the ultimate goal a comprehensive evaluation system also need to be established with multi-dimension involvements from universities, enterprises, etc.

(5) The specialty/system focus is not only emphasis on relevant knowledge acquisition but also paying attention on soft skills and individual growth by assisting student club and student society activities and events, supporting and encouraging students to participate in various technical competitions hosted by enterprises. With solid foundation our graduates will be well prepared to face future challenges.

2.3 Design scheme

With five-year development, School of Software of HIT has solid foundation on industry-oriented education. According to the national strategic plan on education, to meet the demands for human resources in modern service sector and information enterprises, the tasks in front of School of Software in HIT will be emphasized on following aspects:

- With the current hardware and software environment, based on current “digital enterprise and e-commerce” direction, to establish a modern service sci-

ence and enterprise informationization specialty with internationalization and industrialization characteristics.

- First Phase is to set up “service science and enterprise informationization” specialty. After several years growth and accumulation on both teaching experience and research, the second phase is to establish “service science and engineering” department with its own objectives and directions, as well as with special labs, appropriate work placement bases, separate faculty team and assessment standards.

- On team development, within the next four years a 30-40 members of faculty team with high quality will be built with the full time industry-oriented teacher as core and accompanied with the policy of full-time combined with part time, domestic combined with international, academia combined with industry.

- On recruiting student aspect the scheme will cover both levels include undergraduate and master of engineering. With enrolled in through the national standard college entrance examination, undergraduate students will be able to decide their major among three directions such as IT management consulting, enterprise management and software project management. Enrolled in through national standard graduate school entrance examination graduates will make decision on their study directions at very beginning. The two level education systems are closely related on both knowledge acquisition and teaching approaches, formed a coherent industry-oriented education system. According to the plan, the enrollment will not exceed 90 students per year for undergraduates and 80 students per year for graduates.

- On international collaboration, the plans are to co-develop service science series courses (e.g. Introduction to Service Science, IT Service Management, On Demand Transformation Technology) with research organization of IBM, to set up special joint class on enterprise consulting with SAP, to start a joint master program with UBL of France on enterprise production management and software engineering management.

3 Education Framework

This specialty develops with the emphasis not only on fundamental knowledge acquisition but more importantly on stressing practice-oriented and hands-on ability. A systematic education is achieved through implementing series of tasks, such as lecturing, doing lab assignments, participating in group course project finishing individual final year project, attending short term intensive training in enterprise and undergoing internship etc.

3.1 Curriculum System

The structure of undergraduate curriculum system consists of seven portions including fundamental courses, fundamental specialty courses, specialty courses, management courses, course projects, 4 weeks intensive training and final year project and dissertation. The details are as follows:

(1) Fundamental courses are English, mathematics, probability/statistics, linear algebra, mathematical analysis and design, computer professional ethics, mathematical modeling, physics and philosophy etc.

(2) Fundamental specialty courses include C programming language, data structure and algorithms, operating system, database system, compelling principle, computer network, discrete mathematics, computer practical foundation, digital logic circuit principle of computers, object oriented technology and UML, software engineering, software project management, java programming language, software component and middleware technology, software quality assurance and testing etc.

(3) Specialty courses are IT support technology on service management, enterprise knowledge management, e-commerce and e-government, ERP and application, ERP management system and application, CRM system, SOA and distributed system, service quality management etc.

(4) Course projects include those on data structure, database system, software engineering, programming project and integrated practical project on IT service etc.

(5) Management courses are communication skills, service marketing, service behavior, IT enterprise management, financial management, intellectual property law, IT enterprise creation and management, contract law, business negotiation etc.

(6) Intensive training means that students will undergo 4 weeks intensive training in IT company.

(7) Final year project and an dissertation. Each student will spend 10 month internship in enterprise with two advisors one from university and one from enterprise. Each student has to finish certain amount of project work under the guardians of advisor from enterprise and also has to finish a dissertation based the project work with the guardians of university advisor. Finally students have to go through oral defense in order to get degree.

There are two sets of plans in master course system, namely P₁ and P₂. With multiple training models the ultimate goal is to assure the quality of education, and to teach in accordance with students' aptitude.

• P₁ is designed for students who majored in

computer science or software engineering in their undergraduate study.

• P₂ is designed to suit for the need of students who majored in mathematical management and electronic/electric related field in their undergraduate study.

3.2 International Collaboration

To learn and adopt ideas, methods and successful experiences from international partners is an important way to improve our education quality with international competitive ability. There has been 5 years collaboration between School of Software of HIT and DIT. Since 2003, the joint class of HIT-DIT already has enrolled 67 students and 28 of them are graduated with dual degrees of both universities. In September 2006, School of Software of HIT also initiated a joint master program with UBL and enrolled 13 students for the first batch who are now studying in France and followed by the second batch with 14 enrollments. The School of Software is also discussing with UK, Germany, Russia, a multi-country collaboration program are on the way. International collaborations in School of Software of HIT have greatly accelerated the pace of improving international competitive ability of student.

3.3 Practice-Oriented Teaching Approach

Diversiform teaching approaches are adopted to improve the effectiveness of teaching with emphasis not only on in-class teaching but also on practical training outside of class. Practice-oriented teaching/training processes are highlighted in following:

- 90% courses have lab assignments.
- Cumulative evaluation approach instead of one final exam.
- Course projects are deliberately designed to target difficulties.
- Integrated projects are designed to exercise digest knowledge from related courses.
- Short term intensive training in enterprise summer/winter break.
- Student clubs, simulated version of IT companies.
- Offering certificate courses by leading enterprises.
- 10 months internship in enterprises with real project.

3.4 Evaluation Methods

Using continuous and accumulative evaluation method instead of one final exam method the learning processes have been measured and evaluated. With this approach the final grade of each subject is more likely reflecting the true ability of students; it eliminates the unfairness in the old evaluation system. In most sub-

jects the total final grades consist of several parts spread through out the whole processes of teaching learning, for example 100% final grade, it might consist of 10% of class participations, 20% of assignments, 30% of group project and 40% of final exam. Meanwhile to deal with 7th semester syndrome 10 practice related courses have been given heavy weight in calculating final score for exam-free enrollment in graduate school, it makes students to pay extra attention on practice-oriented courses.

Adopted from European system a new more comprehensive evaluation system, examination board is in the development process. It will be used to evaluate each subject with more detail attention on students' performance as well as on teachers' performance, which be able to guide the course content being delivered and teaching method being used.

4 Predictable Results

- To initiate preliminary education system on “service science and enterprise informationization”, and gradually fulfill the details based on practices in the university-enterprise environment.

- To win at least 1 province/above level award on each course system and specific course.

- To have around 50 leading national/international enterprises background in IT consulting, enterprise informationization, etc. as work placement bases.

- To build 15 courses on specialty “service science and enterprise informationization” and 4-5 of them are fundamental on specialty.

- To have two independent laboratories and 2-3 join laboratories with leading enterprises.

- Ideal size is around 400 students.

5 Conclusions

To establish the 2nd-type specialty “service science and enterprise informationization” is not only in accord with the national and international economic environment but also an answer for the development direction of School of Software in HIT. Based on past five years experiences on both teaching and research, the strategic version of 2nd-type specialty is proposed with detailed contents on curriculum, collaboration, teaching approach and evaluation methods. To fulfill the specialty as proposed it needs a long term commitment and it is a continue improving process.

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哈尔滨工业大学“服务科学与企业信息化”第二特色专业建设规划

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摘 要: 随着服务经济时代的到来, 各大学有必要建设相应的服务科学学科与专业以培养具备服务相关技能和知识的毕业生, 以促进中国服务经济的发展。简要介绍了哈尔滨工业大学软件学院建设“服务科学与企业信息化”第二特色专业的战略规划, 包括该专业的建设目标、基本思路、教学框架与手段、期望的结果等。

关键词: 服务科学; 企业信息化; 第二专业; 战略规划

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