

In Order to Improve the Quality of Software Talents Roundly Construct the Software Factory of Sun Yat sen University *

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Abstract Software School of SYSU (Sun Yat Sen University) is in a positive school-enterprise cooperation, and establishes the Sysusoft (SYSU Software Factory). Sysusoft is market-oriented directly, follows the modern enterprise system operation and management, vigorously carries out the software training, software outsourcing, independent research and development, and studiously builds up the ' Sysusoft ' brand. Sysusoft internally undertakes the practice teaching of Software School of SYSU undergraduate students. It promotes the students to synthesize the quality comprehensively, and improves the quality of software talents training. Sysusoft innovates the talents training mode creatively, carries large amount of " high-level international mixed type of application project and multi-skill" software talent according to the needs of the society, and encourages the students to venture the hypothesized market. All these have become the sponsoring software characteristics.

Key words Software Talents Training, Software Factory, School-Enterprise Cooperation, Hypothesized Market, Software Engineering on the study Training

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1 Introduction

China established the " information-based economy " development strategy, and the software industry has become a flourishing emerging industry. Unlike the traditional industry, the software industry is knowledge-intensive, and when talking about its development, software talents training must comes first. The traditional university software talents training mode is " to focus on the theories and ignoring the practice " and the verity is proved that the trained graduates in many current software corporations can hardly meet the needs of industrial development, attributing to the absence of application capacity. So the results are as follows: a large number of software enterprises are unable to find qualified employees, on the other hand, many graduates relapse into a work embarrassing situation. The situation calls for our software talent training mode reflections.

Since 2004, Software School of SYSU has carried out the training needs investigation in Guangzhou, Shenzhen, Zhuhai, Beijing, Dalian and some other cities, including 300 software companies and more. Through the investigation, with the international demand on the software integration of high-quality talents, we set up a double training goal for the development of

China's software industry, which is to develop " high-level international mixed type of application project and multi-skill " software talents. To better achieve this goal, improve the quality of software talents, responded positively to the Ministry of Education on the model of software school to pursue the " school-enterprise cooperation ", and innovate the model of the instructions software talent training. Software School of SYSU together with South Coast technology company jointly established Sysusoft (SYSU Software Factory).

2 Sysusoft Organization and Construction

Being supported by Software School and Computer Science Department of SYSU, Sysusoft mainly engaged in software development, software outsourcing, software talents training, Certification Grading Test, technical consultations and services, computer systems integration business and so on.

In line with the " innovation, development, practical and being the worth reliable internationalization software producer and provider " prospect, Sysusoft takes the comprehensive customer guidance as a principle, insists on taking the vanguard technology, the outstanding man, the highly effective management and the

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remarkable quality devotes to provide the high quality to the domestic and foreign customers with the information product and the service and thus promotes the development of China's information industry.

SYSusoft invites professors from SYSU to form the Expert Committee, studies the domestic and foreign software market's tendency and development, tracks the innovation idea and the advanced technology, promotes the competitive ability by recruiting talents, develops the benefit by creation, attracts the talents by benefit and so as to form the benign development circulation.

SYSusoft now has nearly 100 staffs including system architects, project managers, system analysts, 15 testing managers, senior programmers, programmers, more than 60 testing engineers and so on.

According to business development needs, by the end of 2008, the number of employees will reach 1200 people, and by the end of 2009 will exceed 300.

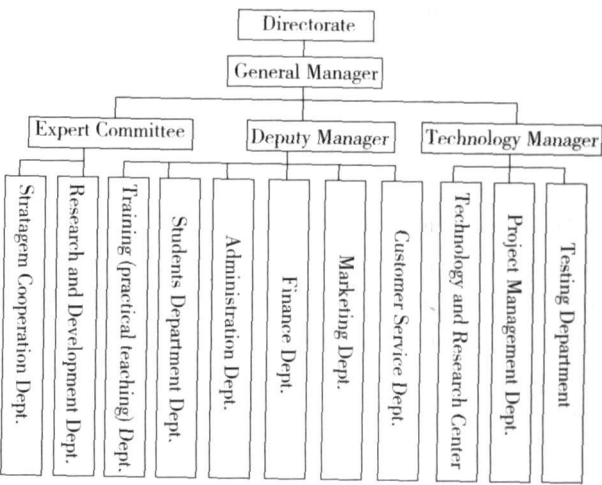
SYSusoft development zone is located in Guangzhou Higher Education Mega Center. At present, it owns 1434 square meters development site, and more than 360 development computers.

SYSusoft has owned an excellent group of IT talents, including business and management experts, system architects, project managers, and testing managers. Most of the high quality IT talents come from the graduates and undergraduates from Software School and Computer Science SYSU, holding the post as programmers and testing engineers.

IT disciplines of SYSU are complete, which have a set of majors in computer science and technology, computer application, network engineering, information security, correspondence software, digital media technology, electronic engineering, automatic control, correspondence engineering and so on. They almost cover the subject kens of computer, electronic, automatic and software engineering. SYSusoft take full use of these technological advantages, to create the well-known "SYSusoft" brand.

SYSusoft focus on the research of the new development technology of software and produces the standardized software component libraries, to realize the expectation of automated software production, industrialization, standardization, high efficiency and low cost. SYSusoft establishes the software production process conforming to the international standard and cultivates the students to master the international software production process by working in project groups. It also produces the software by low cost superiority and insures the security of the business partners by adopting the intellectual property rights confidentiality mechanism through-

out the whole process of software production.



3 SYSusoft Market localization

(1) Software Outsourcing

Guangzhou is the main domestic software outsourcing destinations. Initially, the SYSusoft mainly focus on the software outsourcing business by maximized the advantages of talents and technology priorities in SYSU.

(2) Professional Software Production

Produce all kinds of software applications and systems for the governments and enterprises.

(3) Independent Products and Marketing

Pinpoint market entry points, develop independent products for the market, and lay the foundation of sustainable development for SYSusoft.

(4) SYSU Scientific Achievement Transformation

Annually, Software School and Computer Science Institution SYSU will undertake many substantial research projects, with a batch of scientific research achievements. As an IT corporation, SYSusoft connects to the market closely. The research achievements can be carried on and promoted to the market by SYSusoft, creating benefits.

(5) Provide post practice and practice teaching for the students

SYSusoft has a department named "Training (practical teaching) Department", mainly takes on the practical teaching for the undergraduates of Software School.

SYSusoft offers various software training as follows:

- 1) Pre-employment Practice Teaching to Graduates;
- 2) Job retraining for the job-hoppers;
- 3) Various software qualification certificate training;
- 4) Target training for the governments, industries and well-known enterprises;

5) Teacher training for various training institutions

4 Operational mechanism and managerial mode of Sysusoft

(1) Inside school Sysusoft is the platform of software and media. It belongs to 985 second-stage sub-project of Sun Yat Sen University. As the school's public experiment platform, Sysusoft is open to all the SYSU students, providing service and convenience to those that take part in practice teaching of software engineering, Graduation Design and internship in IT-related major. Outside school Sysusoft, as a separate legal entity, establishes board of directors, puts professional manager system into practice, and runs itself according to modern enterprise system.

(2) Sun Yat Sen University is very supportive to Sysusoft. President Huang Daren personally comments to set up Sysusoft. In Dec. 2006, he comments again that implementation of improving the nurturing quality should be carried out. Guangzhou Software Office and the leaders of Development and Reform Commission have come to examine and direct many times, which give their great support.

(3) Sysusoft is an enterprise of SYSU. Sun Yat Sen University counts its intangible assets as contribution, which counts for 30% of the share managed by SYSU industry group. The investors invested 10 million RMB as Sysusoft development fund.

(4) Sysusoft the student's internship and practice teaching base, as well as the undertaker of graduation design, will implement multi-layered and applied talent cultivation. Sysusoft collaborates extensively with all social circles and carries out a kind of ordered cultivation.

(5) SYSU allocates 1 supervisor and 4 professional project laboratorians. By means of social recruitment Sysusoft has recruited 13 experienced advanced software talents, including project managers, system architects and system analysts, etc. Under the practice teaching and its mode, there are experienced engineers from the enterprises and teachers from SYSU to guide the students.

(6) Sysusoft frequently invites and hires famous teachers and senior experts to deliver speeches. In addition, Forums and Lectures is often held, providing the students with opportunities to face-to-face communications with those master hands and senior software talents.

(7) Sysusoft as a software enterprise, is under standardized management. Currently the software process of Sysusoft put CMM3 into force, and it is esti-

mated to pass CMM4 judge within 2 years.

(8) In last over 1 year's development, more than 1000 persons have been trained, among whom are 600 students. Over those 20 software projects undertaken amounted to 3 million RMB.

(9) Those students that have interned and have been trained in Sysusoft insisted that they really learned a lot from technology, management, software process, team work, enterprise culture and professional quality. They speak highly of Sysusoft. Some said that Sysusoft is a very promising enterprise and "Tomorrow Star of the Guangdong software industry", while others said that it deserves the high tuition fee.

(10) Sysusoft updated 360 special developing computers, introducing series of garrison of Guangdong Southern Seaside Technology Company, Intel, FOXDA, etc., which solve the problems of bachelor's graduation design.

(11) As an independent legal entity, Sysusoft takes on full responsibility for the profits or losses of the company. On one side, it brings about new ideas of nurturing software talents and reforms in traditional teaching of software engineering. On the other side, with school-enterprise cooperation, Sysusoft undertakes many IT projects and assumes external training. Consequently, it not only creates economic effects but it also has its optimum development through self-sufficiency.

(12) Sysusoft collaborates with internationally known enterprises, gradually introduces more international talented persons, and brings in advanced foreign training set, adjusting itself to the need of cultivating talents and providing with more applied elites.

5 Development of practice teaching and virtual venture for students relying on Sysusoft

The original intention of the foundation of Sysusoft is not only to provide the undergraduates and postgraduates of Software School with internship environment and condition inside school, but also to enhance the students' practical capacity of software engineering and the quality of nurturing software talents. It trained, at the same time, talents of applied, versatile and engineering mode.

In order to achieve the above goals, Software School of Sun Yat Sen University cooperates with Guangdong Southern Seaside Technology Company and with their support, begins its work of setting up the base and course system, school-enterprise cooperation.

Software School of SYSU has amended and improved the bachelors teaching plans and cultivating programs. It includes:

- * Put this practice teaching in the list of mandatory courses, with 4 credit hour

- * All the bachelors of Software School should take part in this practice teaching which lasts for 2 and a half months in the second semester of the 3rd Year

- * There is no theoretical class during the practice teaching. All the students should accomplish the development of a software project under the mentors lead

- * The practice teaching imitates a company's managerial mode, in which the mentor is the project's director while some other roles such as PM, SCM, QA, DBA and TS are undertaken by the trainees

Therefore, Sysusoft has formulated a set of teaching courses for practice teaching, including teaching programs, teaching plans, managerial system, procedure standards, training case database, performance rating, performance appraisal, rewards and punishment. From July, 2007 to Oct., 2007, 547 students of the Year 2004 has been trained and it comes out to be effective.

Students of Software School of SYSU have 2 characteristics:

- * high starting point and wide professional orientation

The students job orientation is not limited to IT industry

- * the vision and potential of becoming the group leaders

The practice teaching has its difference from some software enterprises on the job training. Based on specific technology of computer system and the training of industry knowledge, Sysusoft focus much on cultivating the students healthy personality, creative spirit, team spirit and occupational quality.

There are 6 features of the teaching plan:

- * The training job is separated into 2 stages. More attention will be paid to nurturing the students basic working ability in the 1st stage. During the 2nd stage, students will get more developing space according to their interest and strength.

- * Matrix model of organization is adopted in the training job. On the basis of vertical organization of every project team, horizontal role grouping will also be improved to achieve two-way communication.

- * Team construction and atmosphere construction are emphasized in the training job. During this period, students form into different groups and they plan, cooperate and accomplish the analysis, design and development of the software. To set up a learning organization

through collaboration and deepening the understanding of an enterprise culture is one of the important targets in practice teaching.

- * The training job lays equal stress on procedure and process, also on process and result. The products of the projects can't be the only evaluation of the students training result, but some other aspects like working efficiency though the whole software engineering, which guides the students to improve their comprehensive quality.

- * Imparting of the scientific and managerial ways is important in the training job. It instructs the students to adopt various advanced ways in project management. For instance, make full use of the reasonable performance appraisal to promote the project work.

- * The training job also emphasize on the students capacity of mastering and controlling to improve the appraisal level.

The ultimate aim of practice teaching is to cultivate the students independence and healthy professional quality, grounding the students well in serving the society and becoming the backbone of society.

Within the over 1 year of the foundation, Sysusoft has collaborated with many IT enterprises, and took on over 20 projects such as "Prewarning system directly under customs", "SAVL automatic monitoring system for vehicles", "embedded teaching and experiment platform", "No. 7 signaling gateway", "dispatching system for oil company" etc., which amount to a million RMB. Over 100 students took part in the development of these projects and completed most of the coding and testing task. Some students participated in the development of 2 to 3 projects, and some of them have the ability to carry out system analysis and design.

Besides taking on projects, Sysusoft also research and develop independently. Sysusoft attracted 13 high-level software talents from outside the school. These great talents, as project managers or supervisors, instructed the bachelors and postgraduates in project development. Under the modern enterprise managerial system, Sysusoft operates in school-enterprise cooperation and independent development.

Sysusoft invested 800,000 RMB in setting up Students Virtual Venture Fund, which subsidizes students to begin an undertaking virtually inside Sysusoft. The students who work or intern in Sysusoft can apply for this fund. The operation and management of the Virtual Venture Fund refers to risk and fund management model. When the venture projects develop to a certain stage, it will come off Sysusoft and run the company's project independently. Meanwhile, it will be controlled and be shared by Sysusoft. The current fund

ed project is Video Monitoring System on the basis of 2 75 G with the fund amounting to 150 000 RMB. There are 7 students in this venture team, all of whom are Software School bachelors of the year 2004. The student who is in charge of this team is Chen Jingwei, bachelor of the year 2004 in Embedded Software Class of Software Engineering.

There are Software Technology Club and Software Technology Development Center in the name of Sysusoft. The Club is in charge of publicity and promotion, while the Development Center is in charge of the organization and evaluation of all kinds of software competition.

6 Peroration

Innovation of the nurturing mode and improvement of the training quality have been the actively explored

questions by ministry of education and national demonstration software school. Foundation of Sysusoft by SYSU and school-enterprise cooperation have come to initial fruition.

Since the foundation of Sysusoft over 1 year, more than 1000 people have been trained, and there are 600 students among these people. Over those 20 software projects undertaken amounted to 3 million RMB. Funding the student's virtual venture project, Sysusoft undertook 2 session of Software and Technology Innovation Competition. Sysusoft has become the basis of internship and practice teaching, a research center, a venture support and a place where science and research have transformed into results.

Sysusoft has educated many elites for society as its contribution to assuring the teaching quality.