

A Cooperation of SYSU and EMC₂: An Example of SDE^{*}

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Abstract: Software Industry Oriented Education (SDE) brings out an evolution to college education. Different as traditional mode, the new industry oriented mode starts with industry developing, focuses on cases study, ends up to industry again. A cooperation between SYSU and EMC₂ shows that this new education mode improves students' ability and also feedbacks to industry.

Key words: software industry oriented education (SDE); business continuity; information life cycle

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1 Introduction

Software industry is a rapid developing field^[1-3]. For some application aspect, the technology of software industry exceeds college. This technology needs a long time to be brought into college courses after its birth. That means when a "new" technical knowledge comes into students' sight in class, it may be no longer new at all. If education lags industry, it will waste a lot of time and resources to catch up.

Software industry needs people with wide eyeshot to understand the developing perspective, and talented people to solve problems. All the achievements are based on practice.

The essential of education on software industry is to get ability of solving industry problem. The most important are to learn how to analyze the developing situation, how to make estimation, and how to make out and implement project plan.

The ability of finding the problems and solving the problems in traditional are trained in college independently. Right now, industry-oriented education makes out an evolution to this traditional education. Combination of advanced enterprise and college brings out a new road for education.

In this paper, an actual example of cooperation of SUN Yat sen University and EMC₂ Company is brought out to explain the advantage of industry oriented education in academic by associated of advanced enterprise.

2 Background

Today IT steps into to a new period. After solving

computation capacity and network communication problems, information management becomes the key point of today's development. New concepts like "On demand" from IBM, "Intelligent Application Platform" from Brocade and "Information life cycle" from EMC₂ indicate that people focus on management capacity in complicated information system. Unfortunately, people who know the technology lack in this field. The unbalance between education and industry causes a lot of problems.

Colleges have education environment and methods for teaching. Quiet campus, completed experiment building, free mentality and students with good basic training, these facts compose an education platform. SUN Yat sen University has a long history of 80 years^[4]. Senior students from department of computer science have been trained in basic courses and computer theory. Most of them will possibly go in for software industry field. Before their graduation, software industry oriented education can give them wider eyeshot and stronger ability.

EMC₂ Company has an important position in storage field and huge experience in industrial development^[5]. It has advanced technology to make out solutions for business continuity^[6]. To contribute these advantages into reality education, the cooperation of EMC₂ as resources provider and colleges as platform provider can effectively train talented students with

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wide eyeshot

In the cooperation, a "Storage Technology Foundation" course has been added to course list of department of computer science, and the course persisted for an entire semester. Qualified teachers were selected to be trained by the enterprise, and about 200 students joined the course.

With this kind of cooperation, the college gets a good education result that students get positive training. Through the education process, students get better preparation for working in enterprise. The enterprise gets more talented persons. Everyone wins.

3 Industry oriented course

"Storage Technology Foundation" came to be one of the selected courses in Department of Computer Science in SUN Yat-sen University. 193 students (more than 75% of students of the department) joined the course. It consisted a semester and has 18×2 classes. All the materials are based on advanced storage technology and part of the production from EMC2.

The course starts with a topic about meeting today's data storage needs. This very beginning is a problem that happens in today's software industry, and how to solve the actual problem? Ideas and solutions, from simple to complex, from traditional to advanced, from single to networked, come in the continual classes.

The course includes some basic technology like disk arrays, DAS, NAS, SAN, IP SAN, CAS and some advanced technology like business continuity and information life cycle^[6-8]. Cases and solutions are brought out. After the semester, an investigation was made and 116 available ones were received.

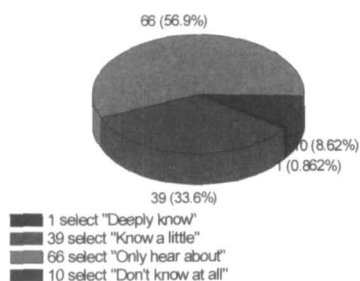


Fig 1 Question 1

The first question is "How much do you know about storage technology before the course?" For this important field in software industry, however, more than a half of students only hear about that, about 1/3 of them know a little. An extended investigation shows that the "little" part of the knowledge known by students comes from earlier courses, and is probably

confusion to the students.

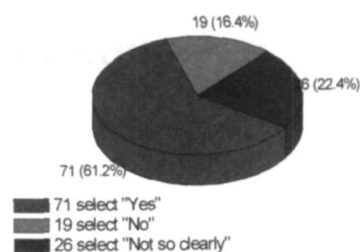


Fig 2 Question 2

As a contrast, the second question is "Do you get the key point of storage technology foundation after the course?" Obviously, most students approach the goal. More than 60% students achieve the basic knowledge about the storage technology.

This change points out that the education purpose has been basically approached. College students are future engineers in industry field. The foundation knowledge improves their power for their future job, and also enlarges the force in their future working area.

4 Cases study

An innovation of this industry oriented course is case study^[8]. Some industry cases have been modified by enterprise, and provided for the college as education contents. All these are basically actual cases (Of course, some details are hidden by modification). They ask students to integrate their basic knowledge and use their creativity. Students try to evaluate the cases and make their own solutions. Then, solutions from students are compared with solutions from the company. By this process, students achieve progress in their ability.

Experiments are also based on cases study. EMC2 Company provides not only cases, but also devices and projects for experiments. A lot of simple experiments are designed to train students' basic knowledge, make them understand the technology. After that, some integrated experiments need students to use their basic theory, creativity and ability for application.

This is a great change. In traditional mode, experiment is to prove the knowledge. But in industry oriented education, experiment is based on actual requirement. This also meets the requirement of enterprise.

5 From eyeshot to ability

A software industry-oriented course starts at industry and ends up to industry, all the procedures are associated by industry. Just like a circle, it goes around and back to the origin. In the journey, people

get promotion at the same time as the enlarging of the circle. In other word, students finish the circle travelling, and the enterprise enlarges its own circle.

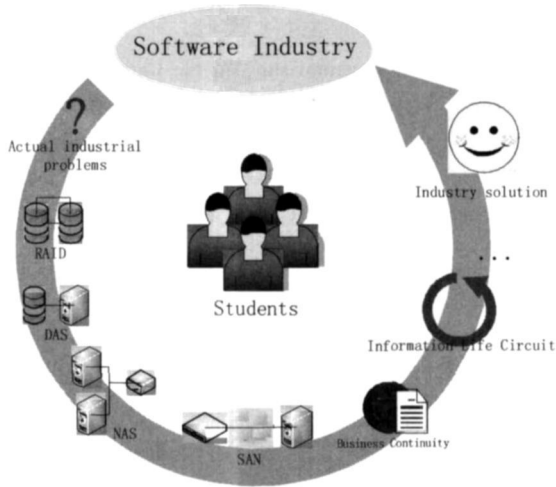


Fig 3 Just like a circle round journey

Wider eyeshot includes storage technology foundations knowledge, the various kind of storage systems architecture, the structures and working functions of networked storage, and much more, business continuity monitoring and managing in the data center. It opens a new field to the students. This field is composed of basic knowledge and further ability. BY this learning procedure, all of the basic modules integrate as an advanced model with practicability and applicability.

Knowledge from textbooks are abstracted from the reality industrial model, and cut to small pieces for adapting students learning ability. However, without facing industrial application directly, there may be a distance from the knowledge to the industrial technology.

Due to the distance, students can't directly contribute their power to work in industrial technology. This is why it needs a long time for graduated students to adapt their job. The essential of oriented education is to reduce the distance and train students' ability.

Ability is never a memory of the theory. Its an idea to make creation and a method to implement. All the abstracted knowledge should comes back to the application, so that it can be approved and used.

"The only standard to approve truth is practice". Students have little opportunity to approve until their graduation. Therefore, most of the time, when take in the job, they lack of preparation to approve, and cause to be in doctrinarism.

To sum up, how can the technology promote? A simple answer is: people find out a problem, and solve it. The wider eyeshot gives students the way to find problem and the attitude to treat the problem, the stronger ability gives students weapon to solve the

problem.

6 Feedback to software industry

At last of the investigation, the question is "After the course, are you interested in having a more in-depth study in storage technology?" 99 of the 116 students choose "Yes".

To contribute its advanced technology to the course, expands force of enterprise in industry. People know more about the enterprise. Its a platform for the enterprise to communicate with the future technology engineer. Rather than business benefit, it is long-term effect that provides lots of persons with ability to promote developing of industry.

The course provides an opportunity for students to touch the advanced technology, and also a channel to understand the enterprise in industry. From the course, they get basic knowledge, interesting, and a platform to the very field. This will be a great force to improve the technology. At the same time, students make a preparation for future working in the enterprise.

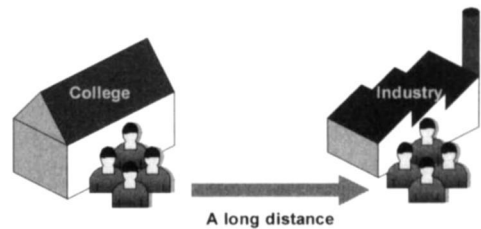


Fig 4 Traditional Mode

In traditional mode, college trains students independently, and enterprise develops technology without considering education. Course knowledge needs a long time to be abstracted to students' class. A distance always appears between college education and industry technology developing. Its no doubt that this distance slows down the step of the whole software industry.

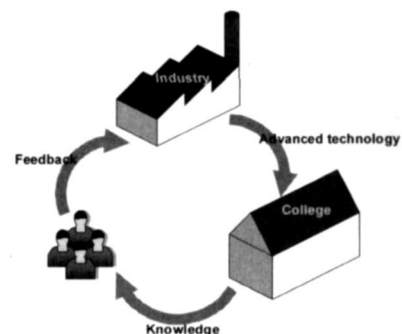


Fig 5 Industry Oriented Education Mode

To catch up, a new mode is industry oriented edu-

cation which brings out an evolution that enterprise and college keep together. They have impact cooperation that one provides technology association, the other one provides education. Ultimately, it improves education, also feedbacks to industry.

7 Conclusion

SUN Yatsen University and EMC₂ Company have had a positive cooperation. An industry oriented course “Storage Technology Foundation” has been haven and gotten a good result.

This paper sums up three different points of view: A student who has finished the course, a teacher who participated in designing the course, and a supervisor from the college.

For software industry, the traditional independent education in college may not completely suit today's situation. Education lagging industry slows down the whole development of society. The new industry oriented education mode evolves the relationship between industry and education.

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