Reform of Programming and Designing Based on Web Service Course Based on The Theory of CDIO

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Abstract. In connection with the course of programming and designing based on web service, there is many kind of knowledge is concerned, and there is more applications in many area. Meanwhile, students study hard in the course because teaching is not effective. So we should reform the teaching through the theory of CDIO. The article states how to use the theory of CDIO to reform the teaching of the course trough the method of conceiving, designing, implementing and operating in every module.

Introduction

The CDIO concept was originally conceived at the Massachusetts Institute of Technology in the late 1990s. In 2000, MIT in collaboration with three Swedish universities --Chalmers University of Technology, Linköping University and the Royal Institute of Technology—formally founded the CDIO Initiative. It became an international collaboration, with universities around the world adopting the same framework. At the moment, more than 20 universities in countries such as Denmark, Finland, France, South Africa, Singapore, and China joined the CDIO co-plan. The CDIO INITIATIVE (CDIO is an initialism for Conceive— Design—Implement—Operate.) is an innovative educational framework for producing the next generation of engineers [1]. The framework provides students with an education stressing engineering fundamentals set in the context of Conceiving, Designing, Implementing, and Operating real-world systems and products. Throughout the world, CDIO Initiative collaborators have adopted CDIO as the framework of their curricular planning and outcome-based assessment. CDIO collaborators recognize that an engineering education is acquired over a long period and in a variety of institutions, and that educators in all parts of this spectrum can learn from practice elsewhere. The CDIO network therefore welcomes members in a diverse range of institutions ranging from research-led internationally acclaimed universities to local colleges dedicated to providing students with their initial grounding in engineering [2].

The collaborators maintain a dialogue about what works and what doesn't and continue to refine the project. Determining additional members of the collaboration is a selective process managed a Council comprising original members and early adopters.

Programming and Designing Based on Web Service Course

Programming and designing based on web service course is an applied, practical, and skilled course which is based on C# language and ASP.NET platform. The course as an important part of computer science and network engineering professional training system, are responsible for students' engineering practical ability in programming and designing based on web service. The training objectives of the course is to enable students to understand the basic principles of programming and designing based on web service, to master a programming language (C#) based on web service, server-side program development, training with the preparation of high-quality

code, and abilities of debug code and to complete the module-design work. Students will become application-oriented talents who can develop web site projects based on Web Service.

There are some shortcomings in teaching of the course.

A. The Programming Capabilities Lack of Adequate Exercises

We select C# language for programming as a programming language in teaching. Students although studied C++ for programming, they just mastered the base skill in programming. Because there are lack of Comprehensive experiments in teaching's plan, Students lack of capacity of comprehensive practical and flexible application.

The programming capabilities of students is directly related to the implementation of our teaching. On teaching the theory, we use the courseware teaching of "preaching"; on Experimental teaching, students complete experiments in the teacher's prompts ; and on assessment methods, the tests are subject to confirmatory and lack of comprehensive [3]. As a result, Students focus only on theoretical knowledge as well as on-machine verification process, and neglects the comprehensive practical ability, eventually leading to the programming capabilities of students is not improved.

B. Lack of engineering capability

Though students do some exercises through experiments and operating the programming, and they can also program to solve some small problems, such as scheduling problem, the use of validation controls, the use of the database control, students are lack of complete training and a certain scale system development.

C. Lack of design in the teaching process

Teachers focus only on single instill knowledge points, and lack of teaching skills and designing for teaching knowledge. As a result, students cannot grasp knowledge points coherently, and lack of overall awareness. Students' comprehensive ability is not strong.

Reform of course based on CDIO

Depending on the course of application-oriented and based on the characteristics of the MVC three-tier structure development, combined with the CDIO concept of the Conceive, Design, Implement , and operate, teaching processes can be divided into a web interface design, logic code, data and library operations early, middle, and high stage [4].

In every stage, we design teaching in accordance with the CDIO concept of organization, knowledge-related, interlocking.

In webpage designing stage, we focus on the V(view) of MVC, that is, focus on the CDIO's CD (conceive and design);in logic coding stage, we focus on the C(controller) of MVC, that is ,focus on the CDIO's CDI(conceive and design and implement);in database operating stage, we focus on the C(controller) of MVC, that is ,focus on the CDIO's CDIO (conceive and design and implement and operate). We reorganize the teaching contents through learning from the whole process of systematic philosophy of CDIO theory, and we design the course teaching according to the teaching principles, the law of students' understanding, ASP.NET course features.

A. Knowledge training route based on CDIO

After students grasp the knowledge and skills of webpage designing and programming for C# and database, we introduced the teaching for asp.net. We easy-to-digest and gradually stimulate student interest in learning, and guide students through conceive, design, implement, and operate of learning courses teaching project knowledge. The knowledge training route is shown as figure 1.

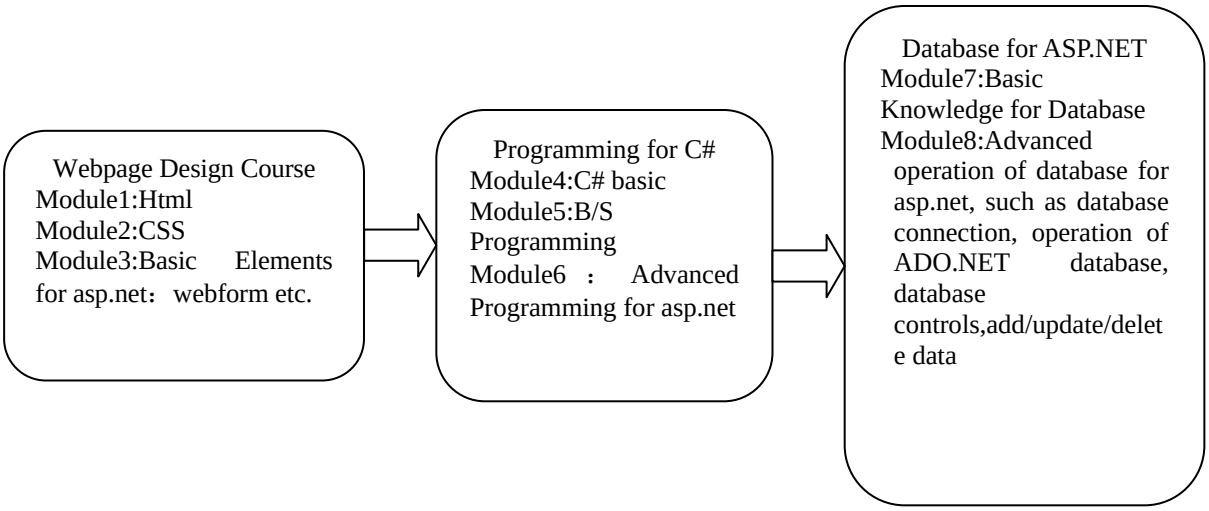

Fig.1. Knowledge Training Route

B. Capacity-building route based on CDIO

Combined with Web2.0 applied in the Internet and based on B/S management system, In the beginning of the course, we allow students to choose and conceive the kind web system of community and information based on B/S.

Students should complete every function module based on CDIO in every module, as well as complete the whole web system based on CDIO.[5] Fist stage, focusing on designing web interface and simply coding can develop students' capabilities of designing Web front page. Second stage, focusing on completing the whole code, the web Interface modifications and landscaping can develop students' ability to programming for database. Third stage, focusing on operation for data can develop students' abilities of adding or deleting or updating or selecting data.

C. Quality Training route based on CDIO

It can stimulate students' interest through being taught and learning in every teaching module. That students complete every module based on CDIO can develop students' ability to learn and participate in discussions. It can develop students the skills of team collaboration, technical exchanges and communication through the deferent project team to complete each stage of the project.

D. Teaching and learning and doing and assessing based on CDIO

We apply the theory of CDIO in teaching and learning and doing and assessing in every teaching module. First, as teaching is concerned, when completing teaching tasks and introducing a project, we focus on conceive and design. It can innovate students' interest by conceiving, and teachers teach students the main knowledge and skill by designing. Second, as learning is concerned, we focus on developing students' conceptual ability, design ability and self-learning ability gradually when they learn new knowledge and skills applied a new project. Third, as doing is concerned, we focus on designing and implement and operating project and teaching content to verify their conceiving and design. Last, as assessing is concerned, we will tell student virtues and shortcomings in study in order to help students improve learning outcomes.

E. Analyzing and filtering the projects based on CDIO

We should filter projects to apply with teaching according to engineering concepts and application concept. There are many kinds of website in internet, such as kind of community, kind of information, kind of property management and kind of enterprises and institutions based on B/S partner. Through collecting, sorting out, filtering and integrating, We arrange different kind project to different teaching modules to let student grasp different skills to develop website.

Conclusion

Today, the goal of course reforming is to improve the teaching quality. As a result, we can achieve the goal of bringing up students to talents when every student can grasp professional skills

completely. It is effective that we reform the course of programming and designing based on web service through using the theory of CDIO [6]. We will success as long as we follow the concept of the project, the idea of the whole process, the concept of student-centered, the concept of the integration between courses and professional training objectives.

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