Research on Elective Courses Construction of General Education in *Web Technology and Practice*

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Abstract. The development and update of Web technology are affecting more and more people, especially for the students in the university. They need to learn more about this technology so as to meet the needs of the society. It is necessary to set up an elective course in general education related to Web technology in colleges and universities. So this paper will establish the elective course which called *Web Technology and Practice*. It combines the technical characteristics of both basic course and technical practice course. And it helps students to understand the computer knowledge, learn the necessary computer skills, so as to serve the society better in the future.

Keywords: Web technology · Teaching mode reform
Course construction

1 Introduction

The development of Web technology [1] affects the social and personal life constantly. The driving force behind the development of Web technology comes from the maturity of network technology. Network technology [2] is also called computer communication [3] or data communication [4]. The main research direction is the safe, reliable and efficient transfer of data signals generated by computers or other devices. Another impetus for the development of Web technology is derived from the upgrading of computer hardware and software. In the aspect of hardware, it experiences from the bulky desktop computer to laptop. And it also has a great promotion in appearance and performance. In the aspect of software which is mostly the browser side, from the launch of the first browser "World Wide Web" to the latest "Google Chrome". The browsers that appear during this process are "Mosaic", "Netscape", "IE", "Opera", "Mozilla", "Safari" and "Firefox". The development of hardware and software all promote the development and change of web technology, in order to make better use of hardware and software resources and achieve more front-end applications. There is another important driving force that is the user's need, the rapid expansion of the number

of Internet users and the rapidly of Internet demand. For more and more college students, especially those who are not majoring in computer science. They are more and more eager to understand the principles, functions and effects of network technology. So they need to acquire this knowledge and skills through general education [5]. *Web Technology and Practice* is an elective courses in general education of engineering technology and technological innovation, which for non-computer majors student. It combines the characteristics of both basic course and technical practice course. This general education requirement helps students gain a better understanding of computers and makes them adapt to their jobs. They will also respect the people who engaged in computer science and communicate with them very well.

2   Course Objectives

The goal of this course is enable students to understand the logical thinking and implementation of Web application design. At the same time, they can understand the grammar structure, function and usage principle of Web programming language [6]. Through this course, students can design and develop a simple and practical Web application project by themselves. This course seeks to connect the theory with practice, and the traditional teaching mode, which is the main line of theoretical knowledge, is transformed into a new teaching mode integrating which combine "Project Guidance" [7], "Task-Driven" [8] and "Teaching-Learning-Doing" [9]. This course gives top priority to self-learning [10] and interest development, and wound them through the teaching process. We take flexible and varied teaching forms. Such as application examples demonstrate, programming practice training, discussion, report, large-scale operations. Through this way, we can stimulate students interest in learning and participate spirit, make them master and apply the knowledge better. The specific goals are shown in Fig. 1.
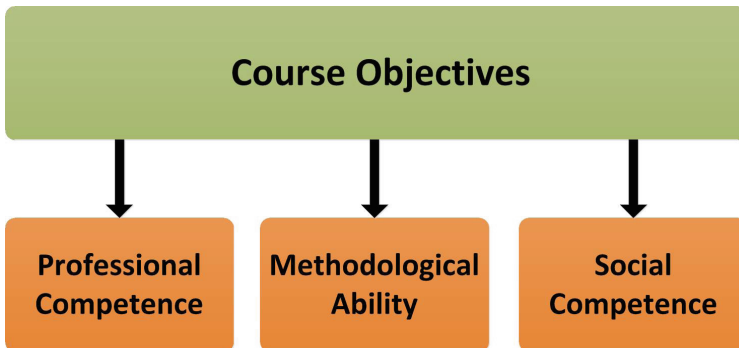

Fig. 1. Course objectives

2.1   Professional Competence

The professional competence [11] is enable students to master the basic knowledge and development techniques of web programs introduced in the course, and use it to complete the production of dynamic Web pages and website maintenance. And understand the development of the latest website design technology.

2.2   Methodological Ability

Methodological ability is integrated classroom learning through practice. Students will obtain the strong practice ability and the necessary basic knowledge. Besides, they will also have the certain ability of data collected, technical learning, ability to migrate, implementation plan and the ability of self-learning [12].

2.3   Social Competence

Through the study of this course, students will have a scientific attitude of seeking truth from facts and they are willing to realize, test and judge various technical problems by hands-on practice. The most important thing is that they will have a strong entrepreneurial spirit and teamwork skills.

3   Course Construction

Course construction [13] follows the operational principle and process of the web-application and introduces the coding environment, software design and development and its application method. The course is based on web-based deployment, design and development tools, basic techniques for describing web applications, and methods for developing website instances using the web language. The content is divided into four parts, which is the basic concepts, application environment, front-end design and program development. The course from theory to practice, displays the overall framework of Web applications systematically, explores the site's resource organization and development process. As shown in Fig. 2, we will describe course construction in detail according to the above structure.
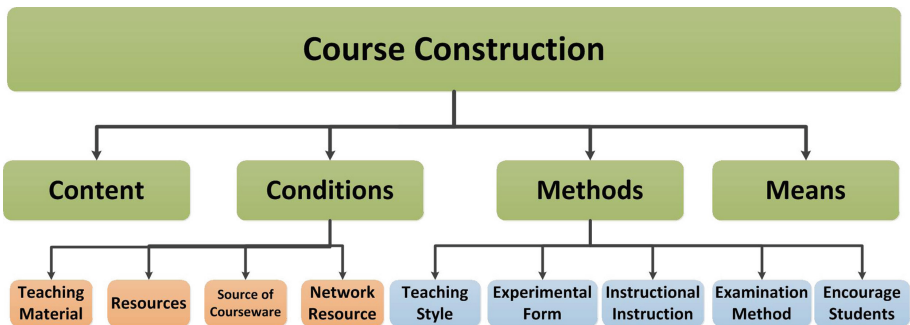

Fig. 2. Course objectives

3.1   Construction of Teaching Content

The construction of teaching contents mainly integrates teaching resources through the teaching process and absorbs a certain amount of the latest scientific and technological achievements and advanced teaching experience in the subject field so as to make the teaching contents more scientific. It should be noted that we should pay more attention to reasonable arrangements for teaching and experiment time.

In classroom instruction content, firstly, we must clear the knowledge context system. According to the characteristics of the course, teachers extract the meta-knowledge and use it to analyze the knowledge points. After obtaining the elements, logic and function of each knowledge point, the relationship between the knowledge points and the knowledge points should be established to form the knowledge system of this course. Secondly, we must optimize the contents of each point of knowledge and example to remove textbooks on the text of a large description and large length of the program, according to the characteristics of knowledge points and student characteristics, to redesign a short, targeted examples. Finally, the teaching content also needs some important problem solving techniques in computer science, which helps students to cultivate strong knowledge and technical updating ability, such as parameter transfer technology, array technology and recursive technology.

In the experimental content, we need build a rich experimental resource base. First of all, based on the classroom instruction content, we must consider the technical feasibility and development trends. And we should design some medium-sized and easily distinguished experimental training topics for each chapter. And the training topics which including daily exercises and homework exercises. The title must Practicality and funny so that the students can feel the joy of programming. Secondly, we also need try to design some open-ended homework topics. It can give students independent thinking space, making their homework has obvious personal characteristics. Finally, the design of each chapter is not independent. The topics must be some functional modules of a comprehensive project such as website. When the course over, the students consolidates the homework of the previous chapters and this becomes their final assignment which is a complete project.

3.2   Construction of Teaching Conditions

Teaching Material. Beside the *Web programming* design which is edited by Genlin Ji et al., we also use some classical books of computer science. Such as *Web programming (version 8)* which edited by Robert W. Sebesta. Through Integrate these books, we sort out a set of general elective teaching materials to meet the requirements of multi-disciplinary students to adapt to the characteristics of teaching material.

Resources. During the course construction, teachers not only select reference books, but also collect cutting-edge theories, methods and techniques. Such as Web 2.0, Mobile Web, Grails 2.0, including technical documents, reports, papers. And then they analysis and sorting out a set of reference resources which supplement the textbook, making the course more in line with the requirements of the times.

Source of Courseware. In the process of teaching, teachers need to update, improve and enrich the courseware [14] constantly. So the courseware can reflect the teaching ideas and content clearly, scrupulously and completely. For example, through animations, describe the behavior and function of the program clearly and inspire teaching. Build a complete courseware repository for students to strengthen their learning and use after class.

Network Resource. During the course construction, we are planning to build "WEB-School" which is a collaborative learning platform for *Web technology and practice*, in order to form a learning system and share resources. The platform can be used as an experimental tool for collaborative learning to expand students' space for collaborative learning. By using the platform, teachers can make teaching administration which includes release the syllabus, courseware, homework and answer the question. At the same time, students can also use "WEB-School" to submit assignments, raise questions and start discussions. In addition, "WEB-School" collaborative learning platform also provides the functions about grouping, learning, communication and cooperation and collaborative performance evaluation.

3.3 Construction of Teaching Methods

Teaching Style [15] We add new methods (the classroom group discussions, reports) to supplement the traditional teaching methods such as multimedia instruction, example demonstration and blackboard-writing. Through the process of problem solving, we develop students' abilities to analyze and solve problems autonomously, emphasize students' autonomous learning, and encourage students to learn to explore research-based learning and group collaborative learning.

Experimental Form. Based on the students' basic training and homework practice, this paper proposes to increase the group's project practice. This practice requires students to work together as a team to build a specific project and combine the personal programming and cooperation projects, focusing on group collaboration, collective evaluation, improve students' ability of teamwork.

Instructional Instruction. In this paper, we propose to enrich the way of instructional instruction [16] with the help of the popular online tools such as

QQ, WeChat and so on. Besides, we also encourage students to participate as coaching teachers in teaching counseling so that students are both problem-solicitors and problem-solvers. When out of class, students and teachers can also communicate and interact online through the "WEB-School" learning platform.

Examination Method. The examination method proposed in this paper is comprehensive which including the students' class performance, daily homework, class reports, examinations, hands-on practice and help students solve problems and many other aspects of evaluation. This examination method pays more attention to assess the overall quality of students.

Encourage Students' Autonomous Learning and Group Collaborative Learning. Through a great deal of practice, students not only deepen the understanding of abstract theoretical knowledge, but also can feel the important role of curriculum in basic research and applied fields. Increase students' interest in learning, cultivate students' basic research norms and comprehensive quality, and lay a solid foundation for future research and work [17].

3.4   Construction of Teaching Means

In construction of teaching means, this paper pays more attention to the combination of traditional teaching methods and modern technology, and makes full use of modern technology such as multimedia teaching and network resources to improve teaching quality and form the online teaching resource base of this course. Specific practices are as follows:

In the first instance, we build "WEB-school" collaborative learning platform for PC, and build networked learning system, real-time communication, answering and discussion between teachers and students. Design the teaching and operation subsystems of "Network Technology and Practice" to realize the network sharing of course teaching materials, program examples, reference materials and work resources.

Secondly, after a period of operation of the platform, if all conditions are met, it is proposed to construct a learning platform suitable for mobile devices, including applications based on IOS and Android operating systems.

Furthermore, it is proposed to set up a WeChat public number for the course of *Web Technology and Practice* based on the WeChat platform for the push of knowledge and the notification of important news.

4   Conclusion

The course of *Web Technology and Practice* not only meet the requirements of general education, but also refine the course according to the construction principle of fine resources sharing course in the future, and share the resources for college teachers, students and social learners.

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