Reform and Exploration of Web-based Training Course Teaching Based on CDIO Mode

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Abstract. In the direction of cultivating applied talents, aiming at the problems existing in the teaching of web development training courses in information management and information system of the university, the design of practical teaching content based on CDIO mode, curriculum evaluation methods and exploring new teaching method. Based on the CDIO education model, students’ teamwork ability and self-learning ability can be effectively improved, and good teaching results are achieved.

Introduction

Fuzhou University of International Studies and Trade is an applied undergraduate college, based on solid foundation, broadening the profession, attaching importance to practice and cultivating ability; in order to stimulate innovation, develop individuality, pay attention to comprehensive, improve teaching, and cultivate the principle of high-quality talents of pragmatic innovation and entrepreneurship To guide the teaching reform of the college. In recent years, with the development of the school, the teaching reform of colleges and universities has been deepened, the basic conditions of teaching have been improved, and the training programs and teaching plans have been greatly reformed. However, there is still a gap between the curriculum system and social needs. Based on the current educational standards and the practical application ability of the students, the teaching reform of the CDIO model in the website development training course is proposed.

Theoretical basis

The CDIO education model is an innovative model of international engineering education reform, and it is also a teaching model based on “project education and learning” and “learning by doing”. CDIO represents four stages of Conceive, Design, Implement and Operate [1], with project-oriented as the main line, in the process of project implementation, to cultivate students’ comprehensive practical ability, innovation and The ability to make decisions, advocating problem-driven, and the project through the learning process, solves the balance between the theoretical knowledge learning and practical ability in engineering education. On the subject of teaching, CDIO emphasizes the student-centered educational thoughts and guides students to learn independently; the main goal of teaching is to cultivate students’ innovative spirit, practical ability, comprehensive ability, teamwork ability, communication and expression ability; The CDIO model refers to the needs of the social industry, from which the corresponding teaching plans and syllabus are formulated, and the modular curriculum teaching meets the industry’s ability requirements for students; in terms of teaching methods, CDIO adopts diversified teaching methods to realize the combination of traditional and modern technologies [2,3].

Analysis on the Current Situation and Problems of Website Development Training Course

Website development training is a concentrated practical course for information management and
information system in our school. This course is practical. The overall arrangement of practical teaching is 24 hours. The teaching goal is to learn the theory and practice of the pre-requisite web programming technology, master the knowledge of all aspects of the scripting language PHP, master the basic website development and design skills, and have certain Web programming thinking. Ability to conduct comprehensive website development or system development on this basis. Develop technical and technical professionals with PHP website design capabilities. According to the results of past practice teaching, students' self-programming ability is not strong. Most students still stay in the knowledge points of simple sub-modules. The comprehensive application of knowledge is not strong. They do not know how to put knowledge in the real project development process. Deepen into the code. In the post-internship position, there is no theoretical knowledge, and there is no way to start. In the process of website development practice teaching, the following questions have been refined:

**Teamwork is not strong**

Due to the lack of understanding of the needs of social reality, the actual needs of social needs involved in comprehensive practical teaching are extremely limited. The websites or systems developed by students often lack practical significance and value, and it is difficult to adapt to the needs of society. In the past practice teaching, the training content is still mostly realized by each classmate, without specific implementation of the sub-component workers, or the corresponding cooperation task assignment. This will not be able to develop students' teamwork and communication skills.

**Students lack active thinking and self-programming ability is not strong**

In the whole process of practice learning, students have great dependence on teachers. They only know the range of knowledge points taught by teachers, and do not understand the expansion of learning. The original experimental content is mostly the case operation of knowledge points. Students will only follow the textbook. In the process of debugging the program, encountering difficulties is not to fully exert the subjective initiative to actively explore, nor to discuss cooperation with the students or to find solutions to the relevant information, but to choose to put the problem on hold. Ignore the cultivation of computational thinking and active thinking; over time, I lose the ability to analyze and solve problems.

**Teaching content lags**

According to the traditional teaching methods, the basic knowledge of the PHP language related to the programming techniques learned in the previous period, and the programming method are reviewed. Then in the practical teaching, the project tasks are generally arranged first, and then the experimental operation is performed; the existing practical tutorials The case of the intermediate machine experiment is based on the relevant operation of the pre-requisite course knowledge. The content of the course is not closely integrated with the professional characteristics of the students and the actual development and application. It is difficult to mobilize the students' interest in learning and enthusiasm for learning. The students only mastered the basic concepts and typical cases of the pre-requisite courses, and did not know why the students used them, nor could they realize the expansion and comprehensive application of knowledge.

**Outdated teaching methods**

The current course basically adopts the teacher multimedia presentation. The one-way instilled teaching mode of the students in accordance with the practical tutorials lacks vivid and interesting examples with professional characteristics and auxiliary teaching methods such as modern technology, which affects the teaching effect to a certain extent. At the same time, it is not conducive to cultivating students' active learning consciousness, resulting in insufficient computer application ability of college students. [4]
Curriculum Practice Teaching Reform Combined with CDIO Mode

Combining the CDIO engineering education concept and professional characteristics, following the principle of “work project as the main line”, we can “do, learn, and learn while doing”, truly embody the teaching concept of “project-oriented, rational and integrated”. It is able to master the learning and operational skills of theoretical knowledge, work process knowledge and other related knowledge in the realization process of the work project. In view of the above problems in the website development training course, this paper puts forward the teaching reform in the three aspects of teaching content, teaching methods and assessment methods.

Teaching content organization under CDIO education mode

The teaching content organization is driven by the project as the core. Through the teacher to release the project tasks, the student group receives, organizes and completes the project tasks, thus achieving the purpose of active teaching. The website development training is a concentrated 24-hour study, which organizes the course teaching content system with a modular structure, and organically integrates various knowledge points and skill points into a single actual website case. The entire process increases the proportion of time spent on student practice and project conception, design, implementation, and improvement, with a greater focus on student-teacher interaction, student-assisted assistance, and project progress. The teaching content organization table shown in Table 1 is shown.

Table 1. Organization of the teaching content.

<table>
<thead>
<tr>
<th>Teaching unit</th>
<th>Teaching content</th>
<th>total period</th>
<th>lecture</th>
<th>Discussion Class</th>
<th>experiment</th>
<th>teaching activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing e-commerce website preparations</td>
<td>Demand analysis; System analysis report (development environment erection, functional structure design, website directory structure design); Database Design;</td>
<td>5 2 1 2</td>
<td></td>
<td></td>
<td></td>
<td>Publish project tasks (teacher) Knowledge point explanation (teacher) Project analysis and design (student) Project implementation (student) Project demonstration (student) Project evaluation (teacher student)</td>
</tr>
<tr>
<td>Front module development</td>
<td>Front desk module; Member center function module; Product display function module; Shopping cart module;</td>
<td>9 2 2 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Background</td>
<td>Administrator</td>
<td>10 2 2 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Attempt to teach methods in CDIO education mode

Based on the educational theory of CDIO, it is necessary to organize teaching with the goal of cultivating practical ability. In the teaching process, the basic policy of “taking the project as the main line, teachers as the leader, and students as the main body” is formed to encourage students to study independently, teamwork, strengthen vocational ability training, and use a variety of interactive teaching methods to complete the course teaching tasks [5]. For example, the project-based teaching method, the teacher plans the project through the teaching content, analyzes, designs, implements and operates the project, so that the students can follow the operation from the beginning to the end of the whole project; the in-class and out-of-class discussion combined with the teaching method ends at the end of the project cycle. The teacher arranges the content to expand the knowledge points, so that the students can conduct self-learning. During the period, the questions can be exchanged and asked by the teacher. This allows students to further master the knowledge they have learned and achieve the integrity and systemicity of knowledge.

Course evaluation method under CDIO education mode

The development of a sound assessment mechanism helps to supervise and motivate students, and the website development training course has developed a detailed assessment method. The final grades of students are 15% (including classroom performance attendance), 45% for comprehensive projects (on-board), 15% for project innovation, and 15% for team communication. Wait for four big blocks. This kind of assessment method requires students to master basic theoretical knowledge and students to have certain hands-on and practical ability. The comprehensive assessment results focus on the student's overall project completion, classroom performance and class attendance, experimental (on-board) students' practical ability, and final project report completion. The course assessment method is shown in Table 2 below.

Table 2. Curriculum assessment items and weight allocation table.

<table>
<thead>
<tr>
<th>Course assessment type</th>
<th>Examination content</th>
<th>Weights</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Work and professional conduct</td>
<td>Careful and careful work, whether it has a good website development and design professional ethics</td>
<td>15%</td>
</tr>
<tr>
<td>2. Comprehensive assessment</td>
<td>Comprehensive assessment of the functions of the front and back modules of the business website (knowledge points)</td>
<td>45%</td>
</tr>
<tr>
<td></td>
<td>Whether the function module design is reasonable; whether the color matching of the webpage is reasonable, whether the overall layout is harmonious and beautiful, and whether the data collection in the front and back is complete.</td>
<td></td>
</tr>
<tr>
<td>3. Creativity</td>
<td>Special assessment of project skills (projects for each project)</td>
<td>15%</td>
</tr>
</tbody>
</table>
### Project unit | Completion level | Grading
---|---|---
Each project unit is assessed separately | Level A: Reflecting the characteristics of innovation | A
 | Level B: Achieve expansion | B
 | Level C: Implement basic functions | C

4. Teamwork and communication skills | Have a good team spirit, eager to help other members of the team; be proficient in operating the website function module | 15%

## Conclusion

Introduce the CDIO education model into the website development training course. Through the reform of the organization of teaching content, teaching methods and curriculum assessment, the students will be fully realized, so that they can do “learning and doing middle school” in the project. The educational goal has reached the goal of “knowledge, ability and quality” emphasized by CDIO. From the perspective of teaching effects, students' enthusiasm and participation are enhanced, the classroom atmosphere is active, and the learning efficiency is significantly improved. At the same time, in addition to mastering the basic knowledge of the course, the students improve their practical ability and self-learning ability, the ability to solve analytical problems, and enhance teamwork and interpersonal communication skills.

## Acknowledgement

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## References


