

Hybrid Teaching Research Based on Project Driven

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Abstract: By analyzing the teaching objectives, contents, learners and necessary skills in Java web application development, a hybrid teaching method base on project-driven is constructed. This method is designed according to the working process and tasks of web development engineers, and is implemented by SPOC platform. An enterprise project is throughout this course, and it realizes the learner-centered teaching model which integrates online and offline teaching. Through teaching practice, this method has achieved good teaching effect, improved the teaching quality students enthusiasm for learning. It also provided new methods and perspectives for the teaching reform of software technology major in higher vocational institutes.

1. Introduction

In order to improve the quality of talent cultivation and solve the unbalance between demand and supply of professionals, governments, industry organizations, enterprises and vocational institutes are vigorously promoting the development of vocational education [1].

Now, most of the software technology specialties of higher vocational institutes in China adopt theory-practice integration teaching method based on project-driven [2]. Teaching is guided by real or virtual projects from enterprises. This method divides the project into several task units according to the knowledge points, and guides students to master software development skills [3]. With the development of the new information technology, acquire knowledge methods for students are more diversified and convenient. The traditional theory-practice integration teaching method cannot meet requirements for core courses teaching of software technology major. There are many problems in traditional teaching methods, such as obsolete content, single mode, lack of guidance and so on. Many students cannot even complete a simple application program on graduation, and give up their major. Some students choose social training institutions to re-learn relevant knowledge. Generally speaking, classroom knowledge has been unable to meet the requirements of skill acquisition, and classroom teaching needs more abundant teaching methods to support it.

Java Web application development is the core course of software technology major. It is a course about Web application development technology. This course is set up by software technology major, software engineering major and other related majors in many higher vocational and applied undergraduate colleges. Taking Java Web course as an example, this paper proposes a hybrid teaching method based on project-driven. This method is designed according to the work process and tasks of Web development engineers. It realizes learner-centered teaching which integrates online and offline by hybrid teaching based on project-driven and SPOC platform.

2. Teaching Mode Evolution of Java Web

Jiangsu maritime institute set up computer application major in 1994 and renamed software technology major in 2007. It is one of the earliest vocational institutes to set up software technology major. The construction of this major has gone through the following stage:

- (1) Introducing the ACCP (Aptech Certified Computer Professional) curriculum system
- (2) Tripartite cultivation by schools, enterprises and organizations

(3) The talent cultivation mode innovation based on wide platform, different direction, stratified-grading, order-oriented

(4) Collaborative education mechanism and innovation platform.

The software technology major had set up Java web application development course from 2006. With the professional teaching reform and the experimental training condition improvement, the teaching methods of Java web application development course had undergone a series of innovations and reforms. The teaching methods had gone through separation of lecture and practice, integration of theory and practice, and hybrid teaching.

2.1 Separation of lecture and practice

In 2006, we cooperated with Beijing Aptech Information Technology Co., Ltd., and introduced ACCP products to optimize the course system of software technology major. The inapplicable courses are eliminated, and new courses adapted to the industry development such as Java web application development and web programming is set up. Through the re-constructing the curriculum system, the quality of teaching software talent training is improved. However, for the constraints of experimental conditions and teaching concepts, the Java web application development course utilize multi-modal teaching method from ACCP, and it divides the course into theory class, computer class, online training and instructional learning class. In theory classes, students can only learn theoretical knowledge, and cannot experience the operation in time, and often lose their attention.

2.2 Integration of theory and practice

In 2011, in order to further improve the quality of talent cultivation and the post adaptability of students after graduation, a tripartite cooperation orders training model was proposed. The talent training includes the tripartite party: the enterprise (Foxcon Software Co., Ltd.), the training organization (Qingdao Software Park Training Co., Ltd.) and the college (College of Information Technology, Jiangsu Maritime Institute). The enterprise put forward the order training requirements, the college and the enterprise together make the training plan, and the college and the training organization construct a mixed faculty team [4]. In the course teaching of the order-based class, the teaching model integrating of theory and practice is introduced, and gradually promoted to the entire core courses of the software technology major. In 2012, the Java web application development course adopted this method. It breaks the boundary between theoretical teaching and practical teaching, emphasizes the organic combination of them, and solves the problem of disconnection between teaching and practicing.

3. Hybrid Teaching based on project-driven

With the selection of high-level backbone major in Jiangsu Province, the software technology major has launched a new round of professional core curriculum construction. The Java web application development course was selected as a school-level course construction project. The overall idea of this course construction is based on the SPOC (Small Private Online Course) framework [5]. It combines the hybrid teaching, project-based teaching and skill-based talent training mode reform, and implements learner-centered teaching which integrates online and offline models.

Based on the distinct professionalism, practicality of the Java web application development course, a hybrid teaching mode is constructed. As shown in Figure 1, the implementation of the hybrid teaching model includes pre-class learning, classroom teaching, and after-class promotion.

In pre-class, teachers need to establish unit goals, make prepare tutorials, extract knowledge points from the enterprise project, and interact online with students. Students follow the prepare tutorials to complete self-learning online by watching micro videos, reading documents, and browsing various resources.

Classroom teaching is divided into two parts, explanation and discussion, and task completion. In the first half of classroom teaching, the teacher sorts out the knowledge points, explains the

difficulties, helps students consolidate knowledge, and realizes the construction and internalization of knowledge. The second half is to complete the project task. The teaching activities are based on project-driven, and rationally integrate theory and practice. In this part, teachers are mainly responsible for arranging tasks, answering questions, summarizing and evaluating. Student groups are the main body of project implementation, and teachers are transformed into a technical consultant. In the process of teaching organization, the competition mechanism is introduced to make the project as a stage for student skills and professional accomplishment.

In the post-class, teachers assist students to consolidate and deepen their knowledge, strengthen their skills, and test the classroom teaching effectiveness. Teachers arrange homework and release unit tests. Students further strengthen their knowledge and skills through online and offline resources.

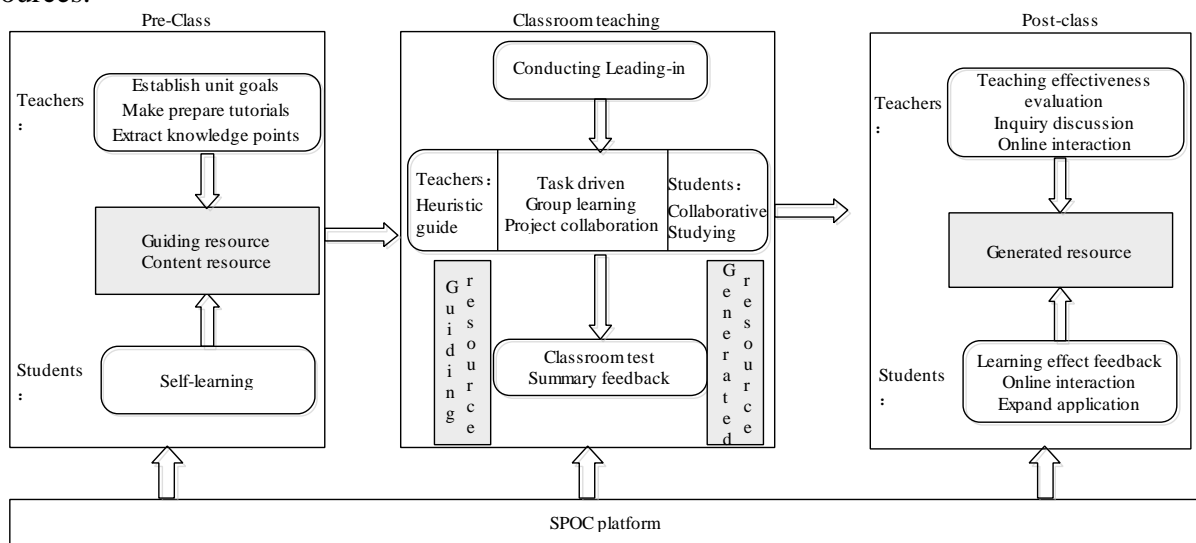


Fig. 1 Hybrid teaching model

Adopting a variety of assessment mechanisms, an objective, fair and comprehensive method to evaluate student learning status is proposed to improve student enthusiasm for learning, promote student academic achievement, and increase student confidence and determination in software development. According to the characteristics of the Java web application development course, the evaluation method shown in Table 1 is constructed. It is a method which combines online and offline, uses multi-evaluation subject, and focuses on the process assessment and practical assessment.

Table 1 Three Scheme comparing

Assessment Type		Assessment Content	rational
process assesment	Usual performance	Evaluating the usual online resource learning and discussion	20%
	Usual homework and tesing	Evaluating the quality of homework and testing	20%
	Practice Item 1	Register module	10%
	Practice Item 2	The module of commodity group	10%
	Practice Item 3	The module of commodity image management	10%
General assesment	Integrated project	Evaluating the projct quality by the report and	30%

4. Effect Evaluation

In order to more accurately compare the differences between the new teaching mode and traditional teaching mode, the final exam results of Java programming course from 2014 and 2015 two sessions. Java programming is the most important pre-course of Java web application

development course, and it basically reflects the ability of software development. The Java programming course all uses the traditional integrated teaching method in different session. The results of the Java final exams for the different sessions are as follows:

Table 2 Score comparison of Java course

	Means	Standard Deviation
2014 session	79.45	10.47
2015 session	78.72	11.23

From the Table 2, It can be seen that there is no significant difference between students from different sessions in the final examination scores of Java programming course. It indicates students from different sessions have same ability before learning Java web course. The teaching of Java Web course uses the proposed method from 2015 session students. Table 3 shows the final exam scores of the Java and web courses from different session .

Table 3 Score comparison of Java web course

	Means	Standard Deviation
2014 session	72.98	8.75
2015 session	81.39	12.41

From the Table 3, it can be seen the final examination scores from 2015 session are significantly better than the scores from 2014 session. It indicates that the hybrid teaching method based on SPOC platform can significantly improve student performance. Compared to the traditional classroom teaching model, this method is very effective.

5. Summary

Through the SPOC platform to carry out hybrid teaching, the proposed method promotes the role of students from passive learning to active learning. It promotes the training quality of software professionals by enhancement of core skill. Through the SPOC platform to carry out hybrid teaching, the proposed method promotes teachers to more fully master the cognitive characteristics of students and courses, and promote the transformation from the original lecture-oriented teachers to the leading teachers. The rapid development of information technology and the changes in the quality of higher vocational students have made the teaching reform of higher vocational software technology courses always on the road. Teachers need to continually rethink and improve teaching activities, such as how to adapt students to the hybrid teaching mode, how to make online and offline teaching more integrated, how to improve enthusiasm and initiative of students.

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