Teaching Reform and Research on the Course "Project Training"

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Abstract: Based on the study of software development methods and maintenance theories, the course "Project Training" guides students in the development of software projects. It is a comprehensive and practical course. This article carries on the reform and the research to the teaching content and the teaching method of the course. Combining traditional software engineering methodology with object-oriented software engineering methodologies, the traditional software life cycle is the main line, and object-oriented development methods and tools are used as the main teaching content. In terms of teaching methods, the teaching methods driven by "cases" and "missions" are adopted, with students as the main body, and students, teachers, and enterprises are involved.

1. Introduction

According to the needs of training computer application talents, through the study of this course, students can understand the general process of software project development and maintenance, initially grasp the traditional methods and the latest methods of software development, and learn related theories and techniques of software engineering. The purpose of the course is to develop students' ability to analyze and design software projects and read documents related to software projects. Through the development of practical projects, students' comprehensive abilities, practical abilities, and innovative spirits are cultivated. It lays a good foundation for future students to engage in software development. The training objectives of undergraduate colleges and universities are to cultivate high-level applied talents with strong professional abilities, fast social adaptability, high comprehensive quality, and strong practical and innovative spirit. How to combine theory with practice, at the same time improve the practical ability of the theoretical study, has always been a difficult problem in the teaching reform of applied universities. Because of the strong theoretical and practical characteristics, it is very important to further strengthen the teaching reform of the curriculum and adapt to the needs of application-oriented personnel training. This article mainly focuses on the characteristics of the curriculum, and studies the two aspects of teaching content setting and teaching method reform [1][2].

2. Course analysis and positioning

"Project Training" is a discipline that guides the development and maintenance of computer software. Students who have mastered the principles of computer science, programming, and database systems, and already have the ability to write simple computer programs, can be provided theoretical guidance on the development of small and medium-sized software projects. For students majoring in computer science, the course is very helpful in the future in terms of professional internships, graduation design, and software development work after graduation. The main teaching content chosen in this course is generally the two most widely used software engineering methodologies which include traditional methodology and object-oriented methodology. In both development methodologies, each development stage includes a large number of methods and tools.

Therefore, the curriculum is complex. What's more, there are many theories, techniques and abstract concepts whose learning is boring. Due to above characteristics of the course, this course has great difficulty in teaching and learning. Teachers tend to feel boring and boring during the teaching process. It is also difficult for students to stimulate learning enthusiasm during the learning process [3]. Therefore, according to the selection of teaching content and the design of teaching methods, students are required to be the main body, and teachers can mobilize the initiative and enthusiasm of student learning.

3. Teaching requirements and setting of teaching content

The basic requirements for course teaching are as follows. The first point is to understand and master the basic principles, processes, and methods of software engineering, including basic knowledge, methods, and tools for software processes, requirements engineering, architecture design, software testing, software maintenance, and project management. The second is skillful application of software engineering in various theories, methods, technologies, tools, etc., with the ability to use software engineering theory to analyze and solve practical problems, especially feasibility studies and system requirements analysis, from the technical point of view, improve software development efficiency. The third point is to understand and master the relevant theories, methods and technologies of software project management, and apply the principles, methods, technologies, tools, software project management flexibly in software development practices, and improve the efficiency of software development from the management perspective. The final goal is to use software engineering principles, methods, technologies, tools for system development and maintenance, and develop a certain scale of software projects [4][5].

The teaching content is set from both theoretical teaching and practical teaching. Theoretical teaching includes software engineering concepts, software development methodologies and software development models, feasibility study process, requirements analysis process, outline design methods, detailed design process, project coding methods, strategies and specifications, software testing methods, process management and project maintenance processes [6]. For a specific project, the practical content includes the feasibility study, the writing of the feasibility study report, the demand analysis, the drafting of the requirement analysis specification, the outline design, the writing of the outline design specification, the detailed design, the detailed design specification, translation into code to implement the specific functions of the software project and the design of test cases.

4. Design and Reform of teaching methods

In the teaching process of "project training", we proposed a teaching method based on "case-task". The so-called "case-task" driven teaching method refers to the selection of a case and a task throughout the course of the teaching process. The case-driven teaching method refers to a complete project case that runs through the entire theoretical teaching process. All of the students are asked to experience how to use the knowledge they have learned to complete project development. The task-driven teaching method means that at the beginning of the course, a task is given to the students so that the students can complete the tasks according to the progress of the course. The following describes the process of teaching implementation from two aspects of case-driven and task-driven.

In the teaching process, the development of software projects is the most important part of the teaching process. The development process of software projects can be divided into five stages which include demand analysis, outline design, detailed design, coding and testing. The person in charge of the project should regularly report the project progress and questions to the teachers. The project team should complete development tasks on each stage on time and submit requirements analysis specifications, outline design specifications, detailed design specifications, software source code, and test reports. Teachers should guide and evaluate each project according to the progress, problems, and documents submitted, and cultivate students' ability to analyze, design, implement,

and write software project documents [7].

At the beginning of the course, the teacher issues the title of the software project to the student and guides the students to complete the topic. In the teaching process, the teachers teaches software engineering knowledge, guides the development of student software projects, supervises the process of student learning, and evaluates the documents submitted by students during each stage of software development. Through the supervision of the software development process, student responses and corporate evaluations, teachers are instructed to conduct a comprehensive evaluation of students' software projects. In the task-driven teaching process, students are the main body of learning and the core of the teaching process. Students are divided into several project teams through a free combination. Each group will identify a responsible person, and each project team can select a topic from the teacher's published topics [8]. Based on the progress of the lesson and what they have learned, students complete the development of a software project through teamwork. Finally, the project team participated in the defense of the software project [9].

5. Conclusion

In order to allow students to understand the relevant concepts in software engineering, the case-driven teaching method of the "Project Training" course divides the entire software project development process into feasibility study, requirement analysis, outline design, detailed design, implementation, testing and maintenance. In order to teach the development methods, processes, and tools at each stage, teachers will select a complete software project case throughout the entire theoretical teaching process. The purpose of this approach is to allow students to understand the development process of software projects and experience the use of tools in software development. In order to develop students' standardization of software project development, teachers provide development documents for selected cases. Through specific examples, the writing methods of software project development documents are introduced to cultivate students' ability to read and write related software project documents [10]. Through the teaching practice and the investigation of teaching effectiveness, for the teaching of the "Project Training" curriculum, this kind of teaching method in which students are the main body, students, teachers, and enterprises participate together, can fully mobilize the initiative of students' learning and improve teaching effectiveness.

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