

Exploration of Learning-Centered Teaching Reform: Taking "PHP Framework Technology" as an Example

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Abstract: In recent years, the teaching concept of "learning-centered" has attracted widespread attention from the education community both domestically and internationally, and has been applied to the reform and practice of teaching models. It implements the core concept of "student development as the centre" in higher education, taking students as the main body of learning and giving full play to their initiative. In this paper, we take the course "PHP Framework Technology" as an example to carry out "learning-centred" teaching reform and explore a teaching mode applicable to programming development courses in applied undergraduate colleges.

1. Introduction

With the continuous development of the Internet and Web technology, PHP Web development has become one of the mainstream of Web application development. PHP Framework Technology is an important professional course for computer-related majors and an advanced course in PHP Web development. The course is characterised by rich knowledge, strong comprehensiveness and practicality, and requires effective teaching methods and modes of teaching to solve the problem of low student interest and unsatisfactory teaching effectiveness.

For application-oriented undergraduate colleges, the goal of talent cultivation is focused on ability cultivation and employment oriented, and to cultivate application-oriented talents with necessary theoretical knowledge, strong practical skills, good professional qualities, noble professionalism, and innovative spirit [1]. The learning centered teaching philosophy regards students as the main body of learning, and teachers become guides and facilitators that encourage students to learn, thus making students independent learners and thinkers. We have implemented a "learning centered" teaching reform and practice in the course of "PHP Framework Technology", adopting a blended online and offline teaching approach that not only satisfies students' autonomous learning, but also enables teachers to play a leading role; adopting group Cooperative learning to carry out inquiry learning, and cultivate students' ability to analyze and solve problems; adopting project-based teaching to combine theoretical learning with practical operation, cultivating students' practical abilities and innovative thinking; integrating ideological and political elements into all aspects of teaching, and achieving the goal of curriculum education through a "moistening and silent" approach.

2. Course Status Analysis

1) Rich knowledge points and limited class hours make it difficult to ensure that all knowledge points are taught. The course "PHP Framework Technology" involves a lot of knowledge and content, which is quite challenging. Students generally feel that the content is abstract and cannot grasp the key points.

2) Strong comprehensiveness makes it difficult to ensure students' full understanding of the knowledge points. The course "PHP Framework Technology" involves knowledge in multiple courses such as web design, MySQL database technology, PHP program design, JavaScript technology, etc. It is highly comprehensive and cannot be well understood by students.

3) Strong practicality makes it difficult to ensure the improvement of students' practical application abilities. The practicality and comprehensiveness of the PHP Framework Technology course are incomparable to other related courses. It is necessary to increase practical hours in teaching and combine project-based teaching with actual projects in order to achieve good teaching results.

3. Reform of the teaching model

3.1 Learning-centered and teaching-oriented

The traditional teaching model is mainly based on transmission-reception, in which teachers teach knowledge to students and students passively receive knowledge. However, learning activity is not a process in which teachers simply impart knowledge to students, nor is it a process in which students passively receive information. According to the theory of constructivism, the teaching process should focus on giving full play to students' subjective initiative, and teachers mainly play the role of leading and guiding students' learning. According to this theory, the teaching mode of "learning-centered and teaching-oriented" is adopted in the teaching of the course, emphasizing the establishment of a good interactive and cooperative relationship between teachers and students, and advocating "contextual teaching" and "cooperative learning". It advocates "contextual teaching" and "cooperative learning". Specifically, teachers provide students with a wealth of learning resources, create appropriate learning situations, stimulate students to think positively, take the initiative to learn, explore problems and think creatively.

3.2 Online and offline blended teaching

The outbreak of the new coronavirus in 2019 once changed the way people live, but also changed the way people learn. During that three-year period, online teaching became the only choice for schools. Compared with offline teaching, online teaching brings greater challenges to teachers, but also shows great advantages. Today, we can use online teaching experience to explore and practice a combination of online and offline teaching methods.

Online and offline mixed teaching includes two parts: online teaching and offline teaching. In the online teaching part, teachers use the online education platform to create online courses and upload rich learning resources for students to learn independently online. In order to realize the combination of online and offline teaching, teachers can design the course teaching into flipped classroom [2], divided classroom and other forms. For example, when designed as a flipped classroom, online courses can meet students' needs for knowledge acquisition before class and practice consolidation after class. Before class, teachers will upload learning resources such as learning videos, documents and exercises to the platform for students to learn independently before class. They can also learn about students' situation by issuing questionnaires, discussions, pre-tests

and other activities. In class, that is, in offline class, students discuss and teachers answer questions about the puzzles and problems encountered in pre-class learning. After class, the online platform is used again to publish post-test or homework for knowledge consolidation. In addition, with the help of online education platform, online courses can also carry out data statistics on students' online learning and assist teachers to better manage classes. In this way, both teaching and learning are no longer constrained by limited teaching hours, and students' autonomous learning ability is exercised [3].

4. Course Instructional Design and Practices

4.1 Determine the pedagogical objectives of the course

Combined with the training objectives of application-oriented talents, the teaching objective of this course is to cultivate students' ability to use PHP framework technology for dynamic web site development, and to be able to handle the development of medium and large-scale web site projects after graduation. Through the study of this course, students can understand the MVC design pattern ideas, can master the basics of PHP framework, can understand and master the framework implementation principles; can build PHP development environment, can configure the project virtual host, can build or use the existing PHP framework for project development. In the actual project development, to be able to enhance the ability to analyze and solve problems, to have a good sense of teamwork, to be able to develop good code specifications and programming habits.

4.2 Reconstruct the teaching module of the course

"PHP Framework Technology" is an advanced course of PHP programming, involving many knowledge points, and the correlation between knowledge points is strong. According to talent training objectives and curriculum objectives, the teaching content is reconstructed and divided into four modules for teaching. The four modules are: preparation module, basic module, framework module and development module. The specific content of each module is shown in Table 1.

Table 1: The specific content of four modules

Teaching Module	Teaching Content	Class Hour
Preparation module	1, Building PHP Development Environment	2
	2, Configure Project Virtual Host	2
Basic module	1, MVC Design Patterns	2
	2, Single entry	2
	3, Route and Namespace	2
	4, Automatic Loading	2
Framework module	1, Inversion of control and Dependency injection	4
	2, Reflect	4
	3, Request and Response	4
	4, PDO Extension	4
	5, Database Operations in the Framework	6
	6, Exception	2
	7, Smarty Template	2
Development module	1, Project Requirements Analysis	2
	2, Basic User Login	5
	3, Verification code	3
	4, The CURD of the Database	6
	5, Pagination Query	2
	6, File Upload	2

4.3 Dual wheel drive of "theory" and "practice" education

Learning is the ladder of growth, and practice is the way to improve your ability [4]. For application-oriented undergraduate universities, the practical aspect is particularly important, and applying what is learned and unifying knowledge and action are the key to training application-oriented talents [5-6]. In the teaching of PHP Framework Technology, the practical stage mainly includes classroom practice and project training. Classroom practice is an important part of the teaching process, each class is scheduled to take at least 15 minutes for students to complete the practical exercises for this lesson, and students can consult with classmates or teachers if they have any questions. Project practical training is a comprehensive small project after explaining some related knowledge points or a teaching module. Project training is carried out in small groups of 6 members each, with roles divided among the group members, such as project leader, back-end developer, web designer, database designer, tester and so on. Through group work, individual learning can be shifted to cooperative learning, so that students can experience the division of labor, coordination and communication in the future work in advance.

4.4 Integrate ideological and political education into course

The fundamental task of education is to establish morality and cultivating people. In other words, the aim of education is not only to impart knowledge and skills, but more importantly to cultivate students' correct values, morals and outlook on life. Incorporating the elements of ideological and political into the teaching of professional courses achieves the purpose of educating people in a silent way. Starting from the first lesson to introduce the course and classroom discipline, as well as various teaching processes such as class attendance, homework assignments, group discussions and practical project training, and final assessment, are all good opportunities for ideological and political education. For example, when describing classroom discipline, students are explicitly told to follow the rules, not to be late, not to be absent from class, and to listen attentively to lectures; in project practicals, students are allowed to experience the importance of teamwork through grouping; when writing code, it is emphasised that they should pay attention to coding styles and code specifications to cultivate a good sense of professionalism.

5. Reform of assessment methods

"PHP Framework Technology" is a practical course, practical exercises throughout the teaching. The traditional course assessment method focuses on the results of the assessment, diluting the assessment of the formative process, which is not conducive to playing the main role of the students, and is not applicable to the "learning-centred" teaching mode, there is an urgent need for a "process-based composite" assessment method, to increase the proportion of process assessment in the final grade evaluation. There is an urgent need for a "process-oriented composite" assessment method to increase the proportion of process assessment in the assessment of final grades.

The assessment of the course adopts a combination of process assessment and outcome assessment. Among them, the process assessment accounts for 60% of the total course grade, mainly based on the students' participation in various activities of the course teaching, such as classroom attendance, usual homework, classroom practice, online learning (watching teaching videos, participating in discussions), project training, etc., and evaluated after data analysis and statistics according to different allocation ratios as Table 2; The outcome assessment accounts for 40% of the total course grade, mainly through the final assessment of the completed project to carry out Evaluation, including project construction, functional implementation, attitude and so on.

Table 2: Assessment Details for Programming Courses

COURSE ASSESSMENT	Assessment Items	Proportion	Assessment Rules
Process Assessment	Attendance	10%	Attendance status for each class, with a maximum score of 100.
	Usual Homework	10%	Assign homework approximately once every 6 class hours and take the average score.
	Class Performance	10%	Listening status and answering questions during class.
	Classroom Practice	5%	Small exercises released in class, such as Multiple choice, blank filling questions, etc.
	Online Learning	10%	Learning data exported on the platform, including watching videos, participating in activities, etc
	Project Training	15%	Group collaboration to complete comprehensive small projects.
Outcome Assessment	Big Project	40%	Display project works, and evaluated based on functional integrity, code standardization, and readability.

6. Summary

In the course teaching of PHP Framework Technology, the "learning-centred" teaching concept has been adopted for the reform and practice of the teaching mode and assessment method, which has achieved relatively good teaching results and cultivated students' independent learning ability, hands-on ability and innovative consciousness.

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