The Research and Application of Flipped Classroom in College Programming Language Education

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Abstract. The integration of information technology and educational technology has made the flipped classroom emerge as a new teaching mode. This paper takes the course of programming language course in colleges and universities as an example, combines the flipped classroom with the traditional curriculum teaching method, and makes a thorough study from the aspects of teaching design, educational content, teaching evaluation and so on. The data analysis of teaching effectiveness shows that the teaching mode based on flipped classroom arouses the enthusiasm of students, improves their autonomous learning ability, and improves the quality of teaching.

Introduction

As a basic course of computer courses, the programming course mainly adopts the combination of classroom teaching and computer practice. The main effort of the teacher in the classroom is to explain the various knowledge points. Because of the lack of the design and practice of the algorithm, the actual programming ability of the students is weak. Students are not fully understand the theory of knowledge and at the same time is required reading a lot of code, the teaching effect is certainly not ideal, but also not good for classroom interaction. The concept of "flipped classroom" is applied to teaching, which can arouse the enthusiasm of students and enhance their ability of autonomous learning and collaborative learning. It has certain practical value and significance for the teaching of program design in colleges. Teachers provide relevant teaching video resources, students watch preview before class, and teachers in class combine video to organize students' discussion and interaction, focusing on explaining and deepening the students' understanding.

The Flipped Classroom

Sahlman Khan: a founder of the teaching revolution, and now in the American mathematics education, his free website is called Khan Academy. A lot of middle school students watch Khan's math teaching video at home in the evening, and they go back to the classroom to do their homework on the second day. When they are in trouble, they ask the teacher and classmates for advice on Academy. This is the opposite of the traditional classroom model of "the teacher is in the classroom during the day, and the students go home to do homework at night ", which we call "the Flipped Classroom".

The so-called "flipped classroom" is a kind of teaching mode that the teacher creates video, the students watch the teaching video at home or after class, and then go back to classroom to communicate with each other and finish their homework.

Why turn over the classroom? What's the difference between flipped classroom and traditional teaching?

(1) The traditional classroom, the teacher forced students to learn, students have completely lost curiosity, as a driving force for active learning, teaching has been ineffective, and so the teacher needs longer time, more forced.

(2) In the flipped classroom, Students in the curiosity of the trend, active learning, only when the problem encountered, the teacher went to help. The more students study, the more confident they become, the more relaxed the teacher is.
The teacher is an actor in the traditional classroom and a screenwriter and director in the flipped classroom.

The basic difference between these two teaching methods lies in the idea behind: the former teacher teaches only to let students learn the knowledge and the latter trains the students and let them learn to grow themselves.

The flipped classroom process knowledge in the classroom let you choose the most suitable way to accept new knowledge; the process of internalization of knowledge is put in the classroom, have more communication and exchanges between students, between students and teacher. The flipped classroom is the optimization of the two cognitive links of imparting knowledge and internalizing knowledge.

Teaching Design

Teaching Platform Design
First, choose the appropriate information platform. The digital campus provides a good network environment for digital learning, and students and teachers can interact in various ways. The platform should be able to provide upload, download, online browsing, online testing, homework, discussion and so on. This can satisfy the students' autonomous learning, meet different requirements and progress of different levels of students, and make appropriate feedback.

Second is the appropriate teaching software and hardware. The hardware environment includes providing multi-media classrooms, computer room facilities complete, can meet every people in a computer, network, projection equipment and blackboard, to facilitate the communication between students and teachers, the software environment includes general computer software, such as operating system, programming environment, database management system etc.

Teaching Content Design

Fragmentation of Tasks. According to the requirements of the flipped classroom teaching, the tasks are broken up and put into the learning center according to the learning schedule and plan. In the process of task fragmentation, we should try to divide the task points with knowledge, and strive to break up short and lean, so as to facilitate the organization of teaching and learning.

Record Teaching Videos. After the knowledge unit is fragmented, video is recorded in the unit of teaching. Each video is controlled within 8 minutes. Through post production and web technology, insert courseware and animation in the video, as well as a variety of related courses supporting information, while the video is embedded in small tests, procedures, courses, discussion issues, and so on. By using the model of "passing through learning", you can only watch the next video after you pass the test of a teaching unit according to the teacher's request.

Design Questions. The application of the flipped classroom teaching model in the course of program design can enable students to study with questions, and make passive acceptance of knowledge become active pursuit. Before class, teachers can design simple questions to help students deepen their understanding of what they learn in video and text, and also allow students to bring their own thinking results or questions into the classroom. In class, by discussing questions, teachers can assess students' understanding of knowledge. Through this method, the teacher can turn the teaching key point, difficult point or other knowledge point into questions design, and transform the traditional knowledge instruction into the task driven, problem oriented autonomous learning and cooperative learning.

Learning Communication Platform. Teachers can also build interactive learning forums on the course website to provide students with online questions, learning exchanges, learning tests, learning reflection and so on. Students can share their learning experiences, ask questions, or conduct online tests through these sections.
Teaching Process Implementation

Autonomous Learning before Class

Students should learn the reading requirements before class, understand the teaching content, by watching the video or courseware to learn relevant knowledge. After the students have finished their studies, they are tested to see if they have grasped the required knowledge. In this process, students can exchange discussions through the online curriculum platform, and teachers can also ask questions in this module. After turning over the classroom, the students can arrange and control their own learning according to their own situations. The students in extracurricular or go home and watch the teachers on the video, can be in a relaxed atmosphere; without be nervous like in the classroom, worry about missing what, or because of distractions to keep up with the rhythm of teaching. Students can master the rhythm of the video. If understand, can fast forward, do not understand, can see again and again, or even stop to think or take notes, and even can seek help from the teachers and partners through chat software.

Knowledge Internalization in Classroom

In the course of knowledge internalization, we adopted the traditional teaching method under the line. The teacher decomposes the teaching task according to the students’ grasp of the unit knowledge, and analyzes the key points and the difficulties. Students are divided into groups according to teaching tasks, and students communicate among groups to solve problems, each team completed the task through collaboration and reported on the completion of the task to the teacher. The teacher organizes students to score other members of the group, and the teacher evaluates each task and evaluates each team's cooperation

Knowledge Consolidation after Class

After class, it is mainly teacher reflection and student practice, which can be assisted by interest group and special studio to improve knowledge consolidation. After the completion of classroom based project, students have sufficient understanding of classroom knowledge, difficulty and key content, grasp the application of knowledge, teachers should encourage students to sum up the problems in their studies and review them. Students will show the project completion report to the teacher, so that teachers grasp the students’ knowledge consolidation, provide the basis for the next teaching design. After school teachers can also set up a special platform for wechat or qq group to facilitate teaching, mainly for common problems, as well as key and difficult problems

Teaching Evaluation Design

Through the teaching evaluation can test the success of teaching design, teaching evaluation model of blended learning is a kind of comprehensive evaluation, it is necessary to complete the teaching of a course and to evaluate the learning effect of students, but also the teachers and students learning platform support is also evaluated, there are two main aspects are as follows:

1. The evaluation of teachers: The students evaluate each link of the teacher through the online teaching platform, and feedback it to the teacher through the online platform. The teacher adjusts and reflects on various aspects through the feedback evaluation results.

2. The evaluation of students: Peer evaluation model can be adopted, students evaluate each other according to the standard after submitting the homework, and finally the teacher will review and produce the final result. Through peer review, not only to solve the large-scale courses of study and homework problems, but the key is in the peer review process, learners can watch other students work, realize the collision sparks thinking, inspiration, achieve mutual learning.

Conclusion

The flipped classroom, used in the program design courses, students complete the study of knowledge before class, through the practice of the project, discussion, reflection and other
activities in classroom to internalize knowledge, and after class through the expansion of the project to consolidate knowledge. The new teaching method can effectively solve the program design course teaching in the problem of lack of time, and at the same time, it can also improve students' cooperation ability, innovation ability and teachers' ability of information teaching and design, and improve teaching quality and teaching effect. Of course, in the practice of program design course the flipped classroom will be a challenge for teachers and students, the nature of curriculum, classroom activity design and control ability, students' self-management ability, learning quality before class, class discussion quality will directly influence the teaching effect. Only by combining the flipped classroom with the traditional classroom can meet the diversified learning requirements of students and effectively improve the quality of teaching.

References