Construction and Practice of BPAPDS Teaching Model for Theory and Practice Integration Course

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Abstract. The integration teaching of theory and practice is the direction of the development of computer science course. Through the practice of teaching reform for two consecutive semesters, a set of BPAPDS teaching models have been constructed, focusing on the basic sequences and teaching methods in the teaching process. With the integration of two theoretical practice courses, the teaching results are contrasted, finally summed up the successes and failures of this curriculum reform, and laid the foundation for improving the teaching model.

Introduction

Following the teaching reform of the Android development platform curriculum, the basic curriculum teaching of Apple's objective C development was kept as a practice of theoretical practice fusion reform. The main feature of this course is the preparation of App development based on the Apple iOS mobile platform, which is also in the category of programming languages. Through the reform of the teaching and practice of the Android development platform, an immersive teaching model based on experience and outcome level oriented empirical internalization is proposed, and the purpose, content, organization and evaluation of immersive teaching reform implementation are described, a new teaching model PAPDS [1] is discovered.

The paper proposes a BPAPDS teaching model for the practice of the integration of theoretical practice based on PAPDS. The model belongs to the flipping classroom, or it belongs to the bifurcation classroom [2], the model’s core leads to the student practice, and the teacher acts as the instructor and supervisor, a new type of immersive practical experience teaching is constructed based on equality, teacher-student interaction, mutual cooperation and co-creation and sharing. This curriculum reform practice based on PAPDS, focuses on classroom teaching process reengineering (CTPR), emphasizing the role of control and supervision.

BPAPDS Teaching Model

The BPAPDS teaching models are Bridge, Presentation, Assimilation, Post-assessment, Diary-checking, and Summary. The introduction of Bridge can be the introduction of new knowledge or Q&A at the beginning of class. Presentation guides the students' knowledge of the course and explains the key points and difficulties taking about 10 minutes to 30 minutes. Assimilation includes the students practice and discussion with the case code. Post-assessment (training assessment), which examines student practice results, can be scored according to the degree of completion. Diary-checking (today's training records check) requires students to record the current main content and difficult points. Summary, mainly sums up the current student's degree of completion and students' difficulties.

Classroom Teaching Process Reengineering (CTPR)

The teaching reform course draws lessons from the last course reform. The number of elective students must be reduced to 32 by half. The second is the lack of evaluation and supervision, and the
third is the lack of student practice teaching materials. Fourthly, assessment emphasizes practice, light theory, and greatly reduces the proportion of theoretical assessment.

Based on the above reasons, this classroom teaching has undergone process reengineering, this is called Classroom Teaching Process Redesign (CTPR) [3-5]. The main features are:

**Student-centered**

Students make evaluations on teaching effectiveness, and students are able to learn theoretical knowledge and improve their ability to actual work as their core goal.

**Strengthen Feedback and Communication**

In class, teachers learn about the difficulties and completeness of each student in a timely manner and have targeted solutions to students' problems.

**Pay Attention to the System View of BPAPDS Overall Process Optimization**

Although each lesson does not necessarily follow the BPAPDS model, each link must focus on defining the activities, emphasizing that each link in the process should maximize the learning effect of students and reduce ineffective activities.

**Using Information Technology to Plan BPAPDS Model**

To develop an APP to record all processes and give scores for each session include the students finally evaluate the class, finally, the problems of every link in the class are found through the analysis and statistics of APP.

**Preparation before Class**

The core contents of the theory practice fusion course are the teacher's explanation and student training, the teacher prompts to explain according to the training result, but the most critical thing is teaching evaluation and supervision. Preparatory work for teachers is very important based on previous experience and lessons learned.

**Preparation of Practical Teaching Materials**

Many textbooks are not suitable as a textbook for students' practice. Therefore, this part must require teachers to prepare practical teaching materials according to their actual situation and be more targeted.

**Select Teaching Assistant**

Some classes are very large with a large number of students or encountering difficult practical content. Or teachers are overwhelmed. Therefore, choosing an assistant teacher to share the burden on teachers can be more proficient in this course. In this class, I selected a student with very rich iOS experience in the same grade as my assistant.

**Student Teams**

Grouping team is a better way. The team leader must be selected in each team. The team leader can share some of the teacher's inspection and evaluation work. Students who are interested in this course and who are willing to serve their classmates can be selected.

**Use BPAPDS Teaching Model Software or Notebook**

According to the BPAPDS teaching model, the development of an APP record classroom related information and content can be used as a lesson plan instead. If there is no software, you can prepare a notebook.

The contents of the record are: Q&A Form: Question Classification (concept, formula, process, etc.), mastery (must be mastered, general mastered), degree of difficulty, correct answer, correct, incorrect, or vague. As shown in Table 1.
Table 1. Q&A Form.

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Questions classification</th>
<th>Master degree</th>
<th>The difficulty coefficient</th>
<th>Answers</th>
</tr>
</thead>
</table>

Practice check form: divided into two, one is the statistical student's overall degree of completion of the practice content, including practical content, training content, length of time, degree of completion, inspectors and other elements, one is each student's training content in the classroom Completed situation. These two forms are Post-assessment training assessments. As shown in Table 2 and Table 3.

Table 2. The Statistical Student's Overall Rates of Completion of the Practice Content.

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Practice content</th>
<th>The training content</th>
<th>Length of time</th>
<th>Implementation degree</th>
<th>Memo.</th>
</tr>
</thead>
</table>

Table 3. Each Student's Training Content Rates.

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Student name</th>
<th>1 Percentage completion</th>
<th>2 Percentage completion</th>
<th>3 Percentage completion</th>
<th>4 Percentage completion</th>
</tr>
</thead>
</table>

**Student Requirements**

Prepare a notebook to record the problems and solutions encountered in today's content and training tasks. Reference book 2 books.

**Problems in the Implementation of Classroom Teaching**

**Not Enough Seats**

Although the "Laboratory Handouts" were pre-printed and an assistant teacher was found, there were only 25 seats but there were 32 students. This resulted in seven students having no training for each class.

**No Grouping**

Because the number of seats was 25, and subjectively felt that there were fewer people and there was a teaching assistant, because there was no grouping, it caused several checks to exceed the class hours. Because when students complete their tasks, they are often approaching class time, and it is too late to check. Therefore, group leader checks are more important, and students can strengthen cooperation, supervision, and interaction with each other.

**Problems for Record Tables**

The checklist was only started in the latter half of the semester, this was a big mistake. During the middle period, the training was more difficult. Some students were out of schedule. Most students were taken care of at that time. Most students completed the training task. The students who have dropped less than 10 students, of course, there is also the problem of insufficient space, students can not complete the training task in time. Without a record sheet, it was impossible to know which students did not have training. When the record table was later implemented, the semester was almost over, and students could not communicate in time to students who did not complete the training task.

**Training Tasks Are Too Full**

Each class has arranged training tasks, especially in the middle and late period, the difficulty task is very large, and the task is full, resulting in 4 hours of training tasks being washed out during the middle of the holiday, and the teaching plan is disrupted, which also does not take into account the
problem of vacation classes. Therefore, even though the training task was not out of touch, the teaching plan was disrupted and some training tasks had to be deleted.

In addition, due to the fullness of the training tasks, theoretical explanations will be compressed. In particular, the Bridge stage is not well executed, and students are not serious about attending training tasks.

Comparison of Teaching Results

After two similar curriculum reforms, the experience of internalized immersion course teaching was initially completed, and the BPAPDS teaching model was completely and clearly constructed. After comparison with the 2016-2017-2 semester “Android Development Platform” exam results As shown in Table 4, two of the courses have the same type of questions and degree of difficulty.

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Name</th>
<th>Highest Scores</th>
<th>Lowest Scores</th>
<th>Average Scores</th>
<th>Passing Rates</th>
<th>Excellent rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017-2</td>
<td>the Android development platform</td>
<td>81</td>
<td>32</td>
<td>58.4</td>
<td>40%</td>
<td>0%</td>
</tr>
<tr>
<td>2017-2018-1</td>
<td>Apple's objective C development</td>
<td>93</td>
<td>43</td>
<td>70.74</td>
<td>84%</td>
<td>3%</td>
</tr>
</tbody>
</table>

Both the highest scores and the average scores, as well as the passing rates, have increased significantly. Through the analysis of the reels, the basic theory scores are similar to each other, but in terms of programming questions, this semester student scored more.

The achievement of better results than the first teaching reform is mainly the full implementation of the BPAPDS model, and the code proficiency after student training is clearly seen during the examination process.

Summary

This semester's curriculum reform has fully implemented the BPAPDS teaching model and has achieved more satisfactory results than the previous semester curriculum reform. There are some deficiencies in the middle that have been exposed, and more preparations need to be done before class, and lessons should be carefully prepared to plan the balance between theoretical quantity and training volume. In addition, future courses also need helper APP and AI to carry out classroom teaching, truly realizing classroom teaching process reengineering and satisfying the needs of students' individualized learning.

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References


