



Research on Classroom Teaching Design based on the BOPPPS Model for "Operating System"

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Abstract. In view of the defects of the traditional "operating system" teaching design, combined with the learning characteristics of students, taking the task of "page-based storage management" as the research object, the BOPPPS model is integrated into the teaching design, each teaching link is reconstructed, and the teaching methods and specific practical operations of the operating system course are summarized. According to the teaching effect, the establishment of BOPPPS model provides a new idea and method for improving the teaching effect of operating system course, which is obviously helpful to improve the teaching effect of operating system course and can provide reference for training applied talents in colleges and universities.

Keywords: BOPPPS, Operating System, Instructional Design

1 Introduction

With the rapid development of information technology, the era of information-based knowledge economy has arrived, and the importance of learning computer has been further highlighted. "Operating System" is a required course for computer related majors and an important professional course in the entrance examination of computer majors[1]. It plays an important role in the structure of students' computer professional knowledge. However, the teaching method is still relatively simple, and the transfer of knowledge is mostly limited to mechanical copying, which leads to the lack of enthusiasm and innovation in learning, and it is difficult for students to apply what they have learned.

BOPPPS model is a teaching model based on constructivism, focusing on students' deep participation and participatory learning activities. It divides the teaching process into six stages, namely, B (Bridge-in), O (Objective/Outcome), P (Pre-assessment), P (Participatory Learning), p (Post-assessment) and S (Summary). It divides the whole classroom and provides teachers with a theoretical system to guide all aspects of classroom teaching[2]. In practice, it needs to carry out targeted teaching process design and adopt various teaching methods to achieve all-round participation of teachers and students in interactive teaching[3-5]. Therefore, it can enhance students' interest in learning and improve teachers' classroom teaching effect.

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2 Blended instructional design based on BOPPPS model

"Operating System" is a required course for computer-related majors in colleges and universities, which plays an important role in students' computer professional knowledge structure. The purpose and task of this course is to enable students to fully understand and master the goal, function and model of operating system, and to understand the function and implementation process of operating system from the perspective of resource management. The content of the course is very logical. The traditional classroom teaching is based on the teacher's classroom explanation. Students' enthusiasm for learning can't be well stimulated, and even after learning the course, they do not have a good grasp of the basic principles and concepts. In addition, the boring knowledge points in the teaching process make it more difficult for students to understand, and their attention is easily distracted.

According to the needs of application-oriented talent training, we should create a teaching environment that integrates software, hardware, and online and offline. The information means used in this paper is super star learning. To be specific, online course resources mainly include the following categories: First, learning tasks, dividing a lesson into several small stages, and clarifying the content of each stage. Second, videos, each 10-15 minutes, talk about a single knowledge point, or practice questions. Third, courseware. Fourth, thematic discussion, aimed at guiding students or consolidating the learning effect. Fifth, extended information, generally written materials, small papers, books or exercises. Sixth, in-class tests, exercises for students to practice in class, have specific questions, quick answers and other forms. Seventh, homework, according to the specific content, set multiple answers, or student evaluation. Eighth, the test paper, using the form of the unit to test the knowledge points.

With partitioned memory, each program always requires one or more contiguous storage areas of main memory, and the size of the job or process is still limited by the size of the partition or the available space of memory, so sometimes in order to accept a new job, it is often necessary to move the information already in main memory. This is not only inconvenient, but also expensive. The use of paged memory can not only avoid the work of moving information, but also minimize the fragmentation of main memory. The focus of this lesson is on understanding page frames, pages, logical addresses, page tables, and address translation. The hard part of this lesson is address translation.

Therefore, this paper takes "page-based storage management" as an example to study how to use BOPPPS model to design teaching, flexibly use information-based teaching methods to enhance students' interest in learning, and improve the teaching effect of the course.

2.1 Introduction of course knowledge points

Through the design of this part, we can attract students' attention and have a strong interest in learning professional knowledge driven by curiosity, so that students can enter the classroom as soon as possible[6-7]. Before explaining the "page-based storage management mode", the teacher posted a discussion on the learning platform: the

continuous storage management mode has several shortcomings, so can we adopt the discrete storage management mode? If so, how to separate it? At the same time, put in a few photos about choosing seats in the cinema. Let the students think about the problem with reference to the picture. And then introduce the knowledge points that need to be explained in this course. Through observation and thinking, students have a preliminary understanding, which triggers students to think about how to achieve page-based storage management, and what matters should be paid attention to in the process of implementation.

2.2 Establishment of learning objectives

The learning objectives and key and difficult points of this lesson are explained to students by means of blackboard writing and PPT. Through the study of this lesson, students can focus on mastering the page storage management mode, understanding the concepts of page, physical block and page table, understanding the secondary page table and inverted page table, and mastering the address relocation through example analysis. At the same time of establishing the goal, it shows students the key and difficult points of course learning, which is convenient for students to learn and think, and lays a foundation for later learning of request page storage management mode.

2.3 Find out before class

Before explaining the tasks of this course, teachers can choose different ways to understand the students' early knowledge reserves, for example, release tests based on the learning platform to understand the students' mastery of continuous storage management mode, and rush to answer based on the learning platform to understand students' familiarity with physical memory related knowledge points. Based on the learning platform to answer the selection, a few good friends go to the movies together, how to choose seats? Stimulate students' interest in the course content.

2.4 Participatory Learning

Participatory learning occupies an important position in the whole design concept. No matter how to design, students are always the most important part of the whole teaching process[8]. Put forward the question of cinema seat selection, the question will cause students to naturally want to explore the answer to the question, through the participation of students, guide students to think deeply about how to use page storage management to solve the problem of memory allocation, thus leading to the concept of logical address, address relocation. In this process, the learning platform is used to carry out group discussions, rush to answer and other activities to stimulate students' enthusiasm for learning, and at the same time, according to the answer situation, students are encouraged to accumulate their usual achievements. The classroom practice shows that the learning effect of students' active participation in case analysis is better. Moreover, students' language expression ability, communication ability and teamwork ability have been improved to varying degrees.

2.5 Test evaluation

Check and accept the learning results of students through after-class testing. Before the end of the course module, the teacher will ask the students about their understanding of the page-based storage management method through a questionnaire. If there is something they don't understand, they can publish a topic in the learning channel and discuss it together, so as to further consolidate their knowledge. After participatory learning, students can test their mastery of this lesson through tests and curriculum design after class, and test whether they have achieved the pre-set learning goals.

2.6 Course summary

A very important part of classroom teaching is the course summary, many teachers tend to neglect the review of this section of course knowledge in class, resulting in the anticlimactic learning of knowledge points, students can not have a systematic understanding of the course learning[9-10]. The course summary is a brief review of what has been learned in this lesson. The purpose is to deepen the students' impression of the knowledge points related to page-based storage management, so that the students can understand the content of this teaching, what are the key and difficult points, and whether the goal meets the expectations. Or let the students discuss in groups and the group leader summarize. Teachers comment, emphasize the key points and difficulties. The participation of students can better reflect the effectiveness of this teaching, and the teaching effect is better. Finally, use the learning platform to arrange after-school exercises, expand reading, and consolidate what we have learned.

3 Teaching Effect and Reflection

In the research, we apply the BOPPPS model to the classroom teaching of the operating system course, and test the applicability and effect of the BOPPPS model in the operating system course by testing and evaluating the students' learning effect.

3.1 Teaching effect

After application and practice, we find that the BOPPPS model has a significant teaching effect in the operating system course. First of all, BOPPPS model can attract students' attention and improve their interest and participation in learning. Secondly, the BOPPPS model pays attention to students' deep participation and participatory learning, which helps to improve students' learning effect and understanding ability. Finally, the BOPPPS model can effectively evaluate students' learning achievements and mastery through pre-class investigation, post-test and summary, and provide a basis for teachers' teaching improvement.

On the other hand, the teaching level of teachers has been improved to some extent. First of all, the design of BOPPPS teaching scheme is helpful for teachers to sort out the important and difficult points of teaching and rationally arrange the time re-

quired for each link. BOPPPS teaching model focuses on the establishment of learning objectives, and all the design links are carried out around the learning objectives, which helps students to clarify their thinking and grasp the key points. At the same time, since the teaching plan has been designed for the time required for each link, it is equivalent to controlling the rhythm and progress of the teaching. Secondly, the interaction between teachers and students in class not only enhances students' interest in learning, but also may inspire teachers to generate new teaching inspiration and spark new ideas, so as to realize mutual learning in teaching. Finally, through after-class self-evaluation, mutual evaluation and comment, it is helpful for teachers to reflect on their own shortcomings in teaching, so as to further improve their teaching level.

3.2 Reflection

The outstanding problem encountered in practice is the balance between student participation and classroom explanation. The level of students in a class varies from those who are more intelligent and prefer abstract thinking to those who are less intelligent and prefer intuitive expression. According to the teaching practice, the necessary explanation is still needed. In addition, when designing interactive links, it should be noted that the ultimate goal of interaction is still to help students master knowledge points, so the interactive links must be closely related to the taught knowledge. The best form of interaction to choose is one that is deep and enlightening.

The application of BOPPPS teaching model not only brings great influence to students, but also brings new challenges to teachers' self-cultivation. Objectively speaking, college teachers not only need solid theoretical knowledge, but also must have rich practical experience. This requires teachers to constantly improve their own literacy, understand the development of the industry, actively carry out the exchange of teaching experience between teachers, and use holidays to conduct industry training in enterprises.

In the study, we also found some areas for improvement. First of all, the BOPPPS model needs to be adjusted and optimized according to the specific course characteristics and subject characteristics in the application process, in order to better adapt to different types of courses. Second, the BOPPPS model needs more practice and research to further validate its applicability and effectiveness in different disciplines and courses. Finally, the BOPPPS model needs to be compared and studied with other teaching models and methods in order to better play its role and value in teaching reform.

4 Conclusion

The application of BOPPPS concept provides the design template and teaching basis for the construction of "Operating System" course. Its subjective operability is very strong, and it is convenient to conduct comprehensive design for the actual problems of students' learning in the teaching process. This paper aims to improve the teaching

effect of operating system course by introducing BOPPPS teaching model. The application of BOPPPS model in teaching is helpful to stimulate students' interest in learning, improve students' learning effect and understanding ability, and provide a basis for teachers' teaching improvement.

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