

# *The Application Strategy of “Heuristic Teaching” in the Teaching of Computer Operating System*

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**Abstract:** As the treasure of ancient teaching thought, heuristic teaching method is the soul and characteristic of modern teaching mode. The use of discussion teaching can stimulate students' thinking, fully mobilize students' learning enthusiasm, and gain real knowledge. Teachers should shoulder the responsibility of making students love to learn, do and learn through heuristic teaching, so as to master the basic ability of lifelong learning.

## **1. Introduction**

Operating system is an important course to study computer technology. Only after learning the operating system can we understand the essence of the core software of computer system, which will help students engage in computer software design in the future and more actively promote the development of computer technology in depth. Concurrency, sharing, virtualization and asynchrony are the four characteristics of modern technology, among which concurrency is the most important characteristic - to describe concurrency, an important concept of modern technology is put forward. There are direct constraints and indirect controls between processes, which make the connection between concurrent processes more universal, so as to achieve an abstract model of producer consumer problem This problem is a typical process synchronization problem, so it is necessary to study the effective measures of applying heuristic teaching to modern computer operating system education.

## **2. Heuristic Teaching Method**

Heuristic teaching is the essence of the traditional educational thoughts of the past dynasties. As early as a thousand years ago, scholars proposed to educate students, but they could not wait until they wanted to solve the problems and failed to do so Can't inspire him; The teacher didn't inspire him until he wanted to speak but couldn't convey his meaning. Scholars advocate the combination of learning and thinking, and advocate that only when students are in a state of positive thinking, wholeheartedly seeking to understand but can not get their meaning, and know their meaning but can not speak, can teachers' inspiration, guidance and help be the most appropriate, and the teaching effect is also the best. In the west, the heuristic teaching thought was originally the midwifery from the ancient Greek Socrates' thought. It often used the method of communication. During the discussion, he only pointed out the problems, guided the students to think for themselves, and finally reached a conclusion by themselves. These two theories and methods have also been used in

current education. After a series of elaboration, demonstration and play, they have become today's heuristic teaching ideas and educational principles [1].

There are many ways of heuristic teaching, such as IE question elicitation, reflective elicitation from the perspective of questioning, observation elicitation that deepens students' direct feelings, deductive elicitation that develops logical reasoning according to the internal relations of knowledge points, and improving students' cognitive understanding of the internal and external relations of knowledge points, including comparative elicitation, divergent elicitation, and graphic elicitation. Modern pedagogical theory points out that the core of heuristic education is to fully mobilize the students' positive role, initiative and creativity in learning. By fully mobilizing students' interests and hobbies, students' active thinking can be triggered to achieve the purpose of drawing inferences from one instance and learning by analogy. In heuristic education, teachers should be the students' guides and guides. In the process of classroom, they should carefully design and guide students to adopt classroom discussion to solve difficult problems. Through mutual cooperation, they can explore and study independently, so that students can spread and transform knowledge in the process of solving problems, so as to develop students' ability to analyze the current situation and solve practical problems [2].

### **3. Comparison between Traditional Teaching and Heuristic Teaching Methods**

In many theoretical teaching, most of the teachers adopt the traditional indoctrinating traditional teaching mode, taking the students as a container for passive or passive contact with theoretical knowledge, so that the students can learn relevant theoretical principles and implement the teaching mode for the main purpose. None of these methods can teach teachers' students to think about problems so as to solve practical problems, nor can they achieve the goal of cultivating independent and innovative talents. However, the most needed talents in the market today are compound talents. Therefore, these indoctrinated and injected teaching methods have long been inconsistent with the spirit of the times and need to be changed [3].

The most effective way to completely change the current teaching mode is the heuristic teaching method. However, compared with the traditional teaching mode, the traditional teaching mode ignores the students' subjective ability in the classroom, while the heuristic teaching means that teachers need to start from the actual situation of students, adopt various reasonable teaching methods, fully mobilize students' interest and initiative in learning, and advocate that students also participate in teaching activities. Therefore, heuristic teaching has changed the thinking that students are regarded as passive or passive knowledge points in the traditional teaching mode. Teachers need to vigorously promote heuristic teaching in the classroom and improve the traditional teaching mode.

### **4. Application of Heuristic Teaching Method in Classroom Teaching of Operating System**

#### **4.1 Comparison**

In the process of operating system teaching, a variety of problem-solving strategies can be provided to achieve a certain goal, but each problem-solving strategy is suitable for different computing environments. By asking questions, students can compare different methods and feel their differences, which is conducive to improving their ability to solve problems.

Therefore, when introducing the inter process short-term scheduling method, the first thing to be introduced is first come first service scheduling (FCFS). This scheduling method is simple and easy for students to understand. The teacher explains short job first scheduling (SJF), because this scheduling method is set to increase the system throughput. So, in what environment should these

two methods be used? First of all, teachers need to make students understand that some scheduling methods are not the best method, but only the most appropriate method. However, as long as the method used by students is in line with the environment they use, it is a good choice. Secondly, point out that there are both long processes and short processes in the operating system, and then ask students to think through questions, which scheduling method is beneficial to long processes? Which method is good for short processes? By analyzing the problems, students can compare and analyze the environment that the two scheduling methods adapt to [4].

## 4.2 Analogy

Analogy method can help students understand abstract concepts with the help of visualized examples. Therefore, the definition of process is a key concept in the process of operating system education. If the students can not have a good understanding of the concept, the knowledge behind it will become a castle in the air. In the process of teaching this concept, how to distinguish the two concepts of process and procedure has become the key point in the difficulty. In the process of teaching, the example of making cakes introduced in modern operating system is also used for reference. A person is making cakes, and the recipe is a program. A person is a processor. The process of making cakes according to the recipe is a process. By comparing with real life examples, students can also deeply feel the differences between processes and procedures.

## 4.3 Derivation

In the operating system course, memory management is also a difficulty. Another problem in the teaching process is to make students understand the binding (relocation) of addresses. If you simply introduce what is address binding (relocation), you won't have a deep impression on students. Therefore, you won't be able to understand why you pay attention to the process of address mapping in the processes of different partition management, page management and segment management introduced later. To explain address binding (relocation), you can first give a simple example of an assembly language program, which contains a JMP statement for jump, such as JMP AA (where AA represents a symbolic address). After the sentence is compiled, the character position after JMP will be translated into the position of the statement represented by AA symbol. This address is also a logical address. Then the teacher asks the students through a series of questions: do you know where your process is in the memory when you write the program? If the operating system places the process in a space with a memory address of 2000, can the logical address after the JMP statement in the process ensure the correct execution of the process? After thinking, the students can also deduce that the logical address must be converted into a physical address during the normal operation of the process to ensure the normal operation of the process, and the students can also deduce how to calculate the physical address corresponding to a logical address in class. This tells the teacher that his method is also the so-called address binding (relocation). After the deduction of this case, a deep impression was generated in the students' minds, which laid a solid foundation for the explanation of future learning [5].

## 4.4 Doubt Setting

Doubt can inspire students to carefully consider their own answers, or adhere to the questions they answer, or find errors or deficiencies and improve them, so as to enhance students' understanding of the problems. In the teaching of operating system, it is the key content to use PV action on the amount of information to achieve consistent progress. When the progress achieved by the use of information PV is contradictory, the teacher can inspire students to master this knowledge

point by adopting the method of doubt setting. When explaining, first explain the meaning of P action and V action on the signal source. However, because this step is tedious, remind students that it doesn't matter if they can't remember the specific steps now. Then I will introduce how to realize mutual exclusion with PV operation. Reserve the PPT segment of PV operation with the largest semaphore on the screen, and then students write two groups of programs on the blackboard. There is a critical area between each process. The task is to make the two groups of programs mutually exclusive and enter the critical area. Then on this basis, ask the students: let's think about how to realize mutual exclusion? Students are usually unable to answer because they are completely unprepared. Now the teacher will guide the students: now the teacher will use the P operation and V operation just mentioned. Let's guess how to realize mutual exclusion? At this time, the student union carefully studied the detailed process of PV action retained on the screen. Here, in order to encourage students' bold guess, some students often think that a p operation should be written before the critical area, and a V operation should be written after the critical area, because only p operation can organize a process to run down in some cases, and V operation can wake up a blocked process. Then ask: what should be the initial value of the semaphore? This kind of question will arouse heated discussion among students. Generally, there are three answers: 0, 1 and 2. Then guide the students to deduce which initial value is correct step by step according to the operation process of P operation and V operation displayed on the screen.

In the above explanation process, since all the answers are put forward by students themselves, and in the process of putting forward the answers, students keep thinking and revise their own plans through their own thinking, so after the course, students usually have a very deep understanding of this content .

#### **4.5 Bedding**

In case of complex problems, if the teacher can have some good foreshadowing, guide the students to think, stimulate the students' positive role in thinking, improve the students' thinking ability, fully mobilize the students' initiative and enthusiasm, and let the students draw correct conclusions and plans by themselves, this can be gradual, make the students' logical understanding gradually deepen, integrate and connect, and finally master the knowledge points.

For example, when introducing disk scheduling algorithm, FCFS scheduling is introduced first. Because this scheduling method is very simple, students have no big problem in mastering it. However, when introducing other scheduling methods, it should be explained in detail that the seek time is the most important in the disk performance parameters. Then ask the students: is there a problem with FCFS scheduling under this condition? Some students' associations have pointed out that this method does not take into account the problem of seeking time at all, so its efficiency is not high. On the basis of the above, then ask: can you design a scheduling method that considers the impact of seek time on efficiency? Under this prompt, the students think that each time they find the access request closest to the current address. This is exactly the shortest seek time first method to be introduced below. Also because this program is proposed by the students themselves, it will give the students a deep impression.

### **5. Problems Needing Attention in the Application of Heuristic Teaching Method**

#### **5.1 Teachers Should Make Careful Preparation, Be Flexible in Teaching and Give Effective Inspiration**

First of all, teachers should make careful preparations for the teaching contents before teaching. By summarizing the key teaching contents that need to be introduced in a class, and studying how

to introduce and pave the way for each teaching content, students can enter the situation that they want to know but don't know, and they want to say but don't know how to say, laying a good theoretical foundation for heuristic classroom teaching.

Secondly, in classroom teaching, we should flexibly grasp the classroom atmosphere, and do not completely follow the step-by-step implementation of our own teaching plan. We should carefully observe the situation of the students and be flexible in order to carry out reasonable inspiration. Therefore, the directory system of MS-DOS operating system is generally taken as an example when introducing the directory structure of the operating system. In the course of explanation, the original arrangement was to ask the question after introducing the directory structure of MS-DOS: you can think about why the attributes of files stored in the MS-DOS directory are not as many as those stored in the Current Windows directory? However, since the teaching time was arranged in the afternoon at that time, the students were generally sleepy, so they temporarily focused on a reserved storage location in the MS-DOS directory and asked the question: let's think about it. Why did Bill Gates design these reserved spaces when the hard disk capacity was very limited? Didn't Bill Gates consider it a waste? As this question aroused the students' strong interest, many students also began to think seriously and put forward that this can ensure the future development trend of the software. After arousing the students' interest, they resubmitted the previously prepared questions, which not only completed the educational task, but also activated the classroom atmosphere, laying the foundation for future educational work.

### **5.2 Attach Importance to the Dominant Position of Students**

As far as students are concerned, many years of exam oriented education has made them gradually accustomed to the passive learning method. Therefore, in the process of inquiry education, students may not like to speak or express their views because they are not used to this teaching method. As a result, when teachers throw out a difficult problem, students do not like or even feel embarrassed to express their views despite thinking, or there is a cold spot.

When such a situation occurs, teachers need to carefully observe the students. Generally, they can hear that some students are unwilling to express all their wishes for other reasons, or the volume is too low to be heard by the rest of the students. At this time, the teacher can designate this part of the students to answer in the form of roll call questions and answers, and the students will give reasons. At the same time, teachers should note that no matter what answer the students put forward, they should pay attention to it and make appropriate evaluation. If the students' answers are completely inappropriate, they need to praise the students and point out the next question, so that the students can gradually move towards a reasonable thinking path. Gradually, students will get used to this teaching method. Some students will like to answer questions after a few classes, and other students will slowly join in. At this time, we should guide all students who answer questions for the first time, so as to gradually increase the number of students who like to answer questions, and make the school atmosphere more lively.

### **5.3 Give Play to the Advantages of Heuristic Teaching**

Teachers should allow students to have problems they don't know. Only when students are willing to learn, can teachers have ways to make students learn. For some students, it may take teachers to spend a lot of effort to let students master the corresponding knowledge points, but the advantages of heuristic teaching method are likely to show.

## 6. Conclusion

To sum up, in teaching, open teaching methods can be used to consciously train students' innovative thinking ability, and students' ability to think closely with reality in terms of theoretical knowledge, put forward specific research questions and solve problems flexibly and independently, so as to mobilize students' learning passion and educational enthusiasm. Students can read and reflect with an excited mood, In a harmonious and relaxed educational atmosphere, well-designed open questions can be used to lead students to achieve educational goals; In a word, teachers' use of heuristic teaching mode can make the classroom atmosphere more lively, and students' learning enthusiasm has been greatly improved. In the new stage of vigorously promoting quality education and lifelong learning, teachers need to actively adopt heuristic classroom teaching in school education and cultivate innovative talents suitable for modern needs.

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