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Research on Teaching Reform of Operating System in Universities

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Abstract. Operating system is the core of computer professional course, aiming at the main problems existing in the teaching of operating system, teaching content, teaching mode, the link is weak, the teaching content without considering the cohesion between with other courses such as the curriculum reform of the main measures are put forward. Respectively in textbook selection, teaching the instantiation of teaching, combine the knowledge and the actual operating system application, the analogy of knowledge, a variety of teaching methods such as the combination of a variety of teaching methods and, strengthen experiment teaching, setting up reasonable experiment teaching content and build a network auxiliary teaching platform puts forward the basic methods of reform.

Introduction

Operating system course is the compulsory course and professional backbone course of computer specialty, also is one of many institutions of higher learning one's deceased father grind courses, is of great importance in computer knowledge structure of the status and role, and in the essential role in the teaching of computer professional[1-4]. This course mainly introduces the working principle, design idea, implementation of the operating system process and related theory, its main characteristic is strong theoretical, algorithms, concepts are abstract and difficult to understand. Students are not willing to learn, and teachers are not easy to teach. Therefore, how to improve the teaching method of this course is worthy of our research.

At Present, the Main Problems in Operating System Teaching

The Teaching Content is Updated Slowly. For a long time, the writing content of the operating system textbooks is relatively fixed, and the knowledge updating speed is slow. The course of operating system involves many concepts and algorithms, which is more theoretical. These theoretical knowledge is the principle of the operating system itself, and the development of modern operating system lacks the actual connection, which leads to the abstraction of the students' understanding of the course. And the development of modern operating system, changing the contents of the textbook lags far behind the current social popular mainstream operating system technology, as a result, students receive knowledge is too old.

The Teaching Mode is Backward and the Teaching Method is Single. At present, the operating system teaching basically take the classroom teaching, although many teachers use multimedia courseware teaching, basic it is but the class students listen to the teacher tells "cramming" teaching mode, and some teaching experience rich enough teachers according to the courseware, even these can raise the students' interest in learning, not to mention the cultivation of innovation ability.

Weak Experimental Links are not Conducive to the cultivation of Innovation Ability. The operating system is a strong theoretical and practical course, theory is relatively abstract content, not easy to understand, this needs through the practice to supplement, through the

experiment, let the students understand the implementation of the principle of operating system. But, at present a lot of colleges and universities due to the lack of equipment, some universities have no experiment courses, some universities even started the experiment course, also is some validation experiment, understanding of the principle of the operating system to help is not very big, cannot make students understand the development process of the operating system effectively.

The Teaching Content does not Consider the Connection with Other Courses. As the main course of computer science[5-8], operating system course has a very important position in specialized courses. Its leading courses include C language, data structure and computer composition, and are closely related to computer network, Java programming, compiling principle, database and other courses. Many teachers in the teaching process teaching contents without considering the interface with other courses, is only the operating system as an independent course teaching, focusing on introducing the principle and algorithm, are not able to make organic linking up between courses.

The Main Measures of Curriculum Reform

The above mentioned problems in the teaching of operating system, in today's increasingly updated computer technology[9-10], in order to improve the quality of personnel training, must be targeted teaching reform, therefore, the operating system on the teaching methods and teaching means of we made some exploration and put forward some reform measures.

Reasonable Selection of Teaching Materials. When choosing the operating system teaching materials, we should select new knowledge points, easy to understand, and combine with practical application. After all, the content of a textbook is limited, and some excellent teaching materials can be selected as references to students. Domestic teaching materials on the principle and technology are relatively lagging behind, you can also choose the original English teaching materials, introduced the new development trend in the operating system and advanced technology through the courseware was introduced to the students, both to let students understand the advanced technology of the operating system, and improve the students' English level, is kill two birds with one stone.

Various Teaching Methods are Used. In the traditional teaching of the operating system, due to the strong theoretical and abstract content of the course, many students fall into passive and passive learning state. On the other hand, the teaching mode of teacher's "infusion" is difficult to attract and improve students' interest in learning. Therefore, we should broaden the teaching thinking and adopt various modes of teaching.

Firstly, the teaching of instantiation combines the knowledge points with the practical operating system application. The operating system principle course contains many abstract concepts. When students begin to come into contact with these concepts, they are very difficult to understand. For example, in process management, a process is an extremely important basic concept in an operating system. In the teaching process, we found that if only this paper introduces the definition, status of the process from the concept and process control block, etc., the students there is no real impression will still feel very abstract and difficult to understand. We introduce example teaching method. First, the task manager of the operating system is opened, so that students can see all the processes running in the current system, and the students immediately feel the real existence of the process concept. Then, as we explain the concept of process, we will discuss the principles and source code analysis of specific Linux. Through the introduction of the execution status of Linux, interruptible sleep, interrupted sleep, suspend or tracking state, zombie state and death state six state and process state transition diagram, students can more profound understanding we introduce the process of the basic state and state transition in our operating system is real. For process control blocks, we correspond to the data structure of the process control block in Linux, task_struct. The so-called process control block describes the current situation of the process and all the information that the control process is running is essentially an attribute of a struct. Through this concrete and visual teaching method, students will no longer feel the process concept abstract and difficult, and greatly

improve their interest in learning.

Second, the analogy. In the operating system on some knowledge, can be compared with middle school students daily life more familiar things, such as the interpretation of the processor scheduling algorithm can make students more than people imagine to buy at the supermarket checkout method of circumstances, students can easily think of waiting in line, the resulting first-come-first-served algorithm. This method can easily attract students' attention, and it will be easier to master the knowledge points.

Thirdly, the combination of various teaching methods. In order to arouse students' interest in learning, we can use the method of asking questions to expand the course. For example, in the first class, you can ask "what are the operating systems that you know and use? What are the functions?" "How are the various states of the process transformed? " "What are the disadvantages of paging storage management? Why do processes create deadlocks? Students take these questions to listen and think, and they will be able to devote themselves to the study in the classroom, and grasp the key to find out the answer. Can also use the heuristic teaching in the courses teaching or problem driving type teaching method, for example, in the job scheduling algorithm, can let the student to consider how to design the algorithm, if the student confused about what to do, to inspire the student when people go shopping in the supermarket checkout more at ordinary times what to do, the way students will naturally think of queuing. Then we will guide students to think about whether there are shortcomings, shortcomings, improvements, and algorithms. With these problems in depth, students can find the answer step by step, not only the interaction between teachers and students, but also guide students to think freely and independently. In addition, also the important content of course some of discussion-based teaching method can be used, for example for producer consumer problem can use the form of group discussion, to divide the students into several groups, let each group discussion put forward their own solutions, and then between groups to discuss the advantages and disadvantages of each scheme. This method is easy to mobilize students' enthusiasm and initiative, and cultivate their thinking ability and teamwork spirit.

Strengthen the Experiment Link and Improve the Cultivation of Innovation Ability. At present, many colleges and universities in the operating system is light weight theory in teaching practice, the weak link of experiment, this is not conducive to the students' understanding of theoretical knowledge, is unfavorable to improve students' practical ability, therefore, to strengthen the practice teaching link, promote the contents of the theory learning. Our students in practice course, through in the Ubuntu Bochs platform structures, virtual laboratory environment, the use of open source virtual machine Bochs as operating system development platform, adopted is the Texas A&M university (TAMU) the operating system of the prototype system. In this course design, students programming function of the operating system specific basic covers the operating system is the important concepts, namely the system startup, memory management, virtual memory management, multithreading scheduling, file system, etc., through the course designed to enhance students understanding of the concept and principle of operating system is important.

Through the experiment, the students were instructed to write a "Hello World" version of the operating system, which was of great interest to motivate students to continue to design the operating system with higher difficulty. In order to avoid the beginner's lost in the specific code (such as assembly language code), we have provided most of the operating system code, just keep output statements to modify, the student is very easy to do. We are in the host operating system installation Bochs, Bochs simulation hardware design by the operation of operating system, even if the design is a problem with the operating system (mainly logic problems), Bochs will explicitly told to designers. This allows us to debug the operating system as normal programs do. Through a configuration "with" (in Linux platform, for starters, usually is not a can configure success), the student to complete the "Hello World" version of the operating system is very fresh and a sense of accomplishment, to complete the function of the subsequent more difficult very interested.

Iimprove Students' Interest in Learning and Make Them Aware of the Effectiveness of the Course. If students want to be fully engaged in their studies, the teacher will be fully engaged, arouse their curiosity from the heart of the students, arouse their enthusiasm for learning, and make

them master of learning. Students after the successful completion of a task, will produce a feeling of pleasure, therefore, to improve the students' interest in learning, teachers should give students with the chance of success in teaching, let the student to obtain successful experience. To keep students interested in operating system courses, students need to be aware of the effectiveness of the course. For example, in each chapter, when the hardware knowledge of the corresponding parts is involved, the relevant knowledge of the course of computer composition should be combined. When it comes to compiling links of programs in storage management, the knowledge of compiling principle courses should be combined. When they talk about the process control block organized in the form of queue, would use the relevant knowledge of data structure, they talk about the process of communication, would use the knowledge of computer network, through this connection will be more "l organic ground through professional foundation courses, not only make the teaching of the course is no longer boring, also make the students understand the" effectiveness "of the course, effectively promote the perfection of the whole theory system.

Establish a Network Auxiliary Teaching Platform to Enhance Communication between Teachers and Students. In order to better enhance the communication between teachers and students, and extend the teaching from the classroom to extracurricular, we can build an "operating system" teaching website. On the website, the teaching courseware, teaching plan, teaching outline, exercise instruction, experimental instruction and other contents are put on the website, so that students can learn to use it by themselves. Site also often introduce the development of the latest developments and the operating system update knowledge or technology, and more trend of the operating system (such as: android, i0S) the development of technology case for students in learning and communication. In addition, the website also provides the interactive functions of teachers and students, such as online tutoring, problem communication, online assessment, etc. This provides great convenience for students' study.

Conclusion

The course of operating system is one of the core courses of computer science. In order to make students master this course better, the teaching reform of this course is a work that needs to be sustained for a long time. Need according to the development of the curriculum and the actual situation of students continue to improve the teaching methods, strengthening teaching means, arouse students' interest in learning, in the course of increasing students' ability to analyze problems, solve problems, to improve the innovation ability, cultivate higher quality talents for the country.

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