The Reform and Practice of Operating System Course in Finance and Economics Colleges

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Abstract. Analyzing of the status of operating system course teaching in universities of finance and economics and the existing problems, this paper puts forward the reform of the operating system course in universities of finance and economics. It should draw up the operating system teaching syllabus applicable to non-engineering universities based on its own subject characteristics and school characteristic. Teaching content should be a choice in the depth and breadth and some examples in practice should pay more attention to practical application. The operating system course should be oriented for application, society and for the purpose of employment.

Introduction

Operating system is used to control and manage a variety of computer hardware and software resources, and it is a collection of procedures that can organize rationally of various processes, as well as provide friendly user interface. Operating system is the most important computer system software. As a course, it is a required course for computer related majors. Through learning this course, students can understand the development of the operating system and master the operating system functions, basic principles, design methods and implementation techniques. All these lay the foundation for the follow-up study of other courses. At the same time the status of operating system course is irreplaceable in the students' professional ability and professional knowledge in the architecture with a connecting role [1]. The operating system course has its own characteristics, such as its wide scope of knowledge and complex content. In addition, it involves not only the knowledge of computer hardware such as computer interface and computer composition principle, but also relates to the computer software knowledge such as curriculum design of advanced language program, data structure, database system, etc. In addition to the complexity of content, some of its concepts and basic principles are also very abstract [2]. Its design methods and the realization of technology are difficult for teachers to visually display. The characteristics of the operating system course have higher requirements on the students' comprehensive quality, but for the students of the computer majors in Colleges of Finance and economics, they would not have been interested in computer science, or not enough basic and solid. It will not get good teaching effect according to the traditional engineering college education. Therefore, it is necessary to carry out the curriculum reform, modify the traditional teaching content and methods, so as to facilitate the students to understand and master the course, and adapt to the requirements of the current society for personnel training [3].

The Current Situation and Problems of Operating System Course Teaching

Operating system, as a mature system of software development for many years, involves the basic concept, the basic method and the design principle of computer operating system, which is mainly about many aspects of process scheduling, processor management, storage management, equipment management and document management, etc. At the same time, with the rapid
development of computer technology, the operating system curriculum must be synchronized with the development of the times [4]. Therefore, teachers should always pay attention to the dynamic development of computer and the combination of theory and practice. In the course of teaching the operating system, it is impossible that they want to teach all the relevant knowledge to the students in a short period of several decades. Operating system as system software, especially such as commercial software such as Windows, Linux and UNIX, contain everything in the function of their cover and there are tens of thousands of people in their R & D team. When some teachers teach the operating system course, they take it as certain system software, speaking of its principles, architecture, design and implementation of the code, etc. even they will expand the scope of knowledge widely. After the completion of the whole class, the teacher speaks very tired and very comprehensive, but the students hear more tired and more confused. Because the details of any software to complete a function are many, if all speaking, students will not grasp the focus. And they will also feel that learning the operating system is too difficult. Too many things to learn will put out most of the students' interest and blow their confidence which will make them not willing to learn but weariness on the course. Some of the concepts and principle of the operating system are too abstract, such as parallel and concurrent, time-sharing system and real time system, fixed partition management and variable partition management, basic paging storage management and storage management, basic block to avoid deadlock and deadlock prevention, document logical structure and physical structure, process scheduling algorithm, PV operation, page replacement algorithm and so on [5]. These are not involved in other textbooks and no practical things can intuitively show to the students. Therefore, the students understand it very difficult because of the lack of maneuverability. If the pure stuff is directly to impart to the students, the teaching process will become duller as ditch water. The students' interest in learning is not high and there is no enthusiasm. The teachers will find the students not willing to learn or learn not well which will lose the teaching passion. So the final teaching effect can be imagined.

The course of computer operating system is a kind of comprehensive course which is both theoretical and practical. Course hours of engineering colleges and universities of professional computer operating system are many, hands-on ability of their students is strong and the overall computer learning atmosphere is also strong. If the students of financial institutions are required to learn just as the teaching objectives of colleges and universities, there is no doubt that it is unscientific. Students of computer major in finance and economics colleges have a weak foundation, before entering the university they are not interested in computer [6]. They are often adjusted to computer specialty, therefore computer professional teaching syllabus and teaching target should be developed for finance and economic university. However, many teachers take directly teaching goal of some engineering college as that of application undergraduate students and the teaching content doesn’t do any adjustment or change. In order to complete the syllabus within the stipulated time, they often do cramming teaching, while they don't care whether the students can accept. Certainly, the final result is a substantial decline in the quality of teaching.

The theoretical knowledge of the operating system is difficult to understand. The experimental teaching of operating system can make up for the defects of the theory teaching, and it is the best way for the students to deepen the understanding of the theoretical knowledge through the experimental practice. However, due to the influence of various factors, such as the degree of attention, the level of teachers, students and other factors, the selection of experimental content is different, and the difficulty is also different. At present, there are four main modes of practice teaching in colleges and universities at home and abroad, such as the simulation experiment, the source code reading experiment, the operating system kernel extension experiment and the independent design. The simulation experiment is for the operating system in some typical functions or algorithms, such as process scheduling, memory allocation, disk scheduling and file system programming. This mode is not the real system resources to access and modify the operating system, but is a simulated by programming language programming management module. Source code reading experiment is to read and understand the specific operating system source code to achieve the purpose of understanding the principles and techniques of operating systems, mainly
Based on DOS and Linux code. Operating system kernel extension experiment and independent experiment is the kernel design requirements of domestic first-class research part of university teaching. However, the current situation is that most colleges and universities only pay attention to the operating system theory teaching and ignore the practice of teaching, and even some colleges and universities do not have the relevant experimental teaching practice. Some teachers think that students’ performance evaluation is difficult in experimental teaching and it is also difficult to really test out the students' learning ability. In addition, if the experiment content is too shallow, they cannot help students to further understand the theory of knowledge. If the experiment content is too difficult for students to complete the experiment, experiment content is useless.

At present, the evaluation of the operating system is usually based on the theory of closed test scores and the overall operation of the experimental subject. Although the final exam can effectively examine the students' understanding and mastery of the operating system knowledge to a certain extent, it is difficult to reflect on how the operating system content is really mastered. In addition, many students in the experimental class discuss each other and learn from each other to finish the final submitted report, so the students of the experimental teaching evaluation is very difficult and it is hard to find out the true ability of students.

Operating System Teaching Reform Strategy

Change the teaching concept and optimize the teaching content. The curriculum system of the operation has strong theoretical and financial computer professional students are lack of interest. If the teacher explains all the complex abstract content indiscriminately, he is tired and the students cannot deeply understand the content. Therefore, it is necessary to teach the students what is important and practical in a limited time. Master is king, and not everything is necessary. Otherwise, easy way is loose. Therefore, the teachers should focus on the characteristics of the students to grasp the key content of the operating system and only the most important concept and the basic principle need to be in a detailed explanation. The students need to be guided independent thinking and active research. In this way, the effective use of classroom time can complete the operating system for most students’ ability training.

It is good to innovate on the teaching modes, diversify teaching methods and enhance students’ interest in learning. Operating system curriculum theory content is more and abstract and a lot of knowledge cannot be visually displayed. So students understand it more difficult and learning enthusiasm is not high. Therefore, if only by using multimedia courseware and writing in the classroom, it cannot improve the students' interest in learning. Therefore, it is imperative to break the traditional teaching mode. In order to deepen the students' understanding and improve the enthusiasm of the students, in addition to the teacher teaching, teachers can choose relatively independent content knowledge to assign to students and let them go back later to find relevant information. Then, do the production of PPT and put forward questions on this part. Finally, the teacher summarizes and does some comments. In fact, the students are very happy with the work, and they will create a very creative courseware and gradually integrate into the study. In addition to guide students’ autonomous learning, the teacher can demo process through some flash animation to show how the memory and other resources for the CPU work, which are not visible. In order to enhance the content of understandability, he can also make the students have intuitive understanding of the abstract contents. For example, PV operation is too difficult to understand and he can even make up the micro course. The students may watch micro moment to ask questions, and then he answers in the classroom and timely summaries. Even the operating system can be assigned to the micro class and a group of students explore each other. This form can effectively improve students' interest in learning, but also enhance the ability of students to solve problems.

It is a good way to improve the content of experimental teaching and strengthen the practicality and application. The complementary effect of experimental teaching on theoretical teaching is more and more recognized by everyone. However, how to carry out practical teaching, which projects of practical teaching should be set up, and how to improve the practical ability of students through practical teaching are worthy of study. Operating system is complex for the undergraduate computer
students in finance and economics. At start, they cannot study the Linux operating system source code or modify the function of Linux, which will only undermine their self-confidence. They cannot put directly to the experiment of the source code. But if they only do the simple debugging work, it is not to improve the ability. Reference to other college experience, according to the actual demand, the cultivation of application ability principle should be highlighted and the experimental project should be selected for easy collocations. The experiment content changes from easy to difficult and from the shallower to the deeper. When students encounter a variety of problems in the process of doing the experiment, teachers should be different to the assistance and guidance, so that their ability can be strengthened. In addition, in the experimental teaching, the teaching operating system experiment based on virtual machine, can complete most of experimental teaching and can let students face a relatively real system. For example, the concept of process is the core concept throughout the course but there is no real experimental environment in the past. Only teachers in the classroom describe the concept of process to students but students are invisible. Now with a virtual reality environment, students can create a process on the virtual machine, view the process, and experience the process of ID.

All kinds of means are used to strengthen the teaching quality assessment, so that the teaching assessment is more comprehensive and fair. At present, peacetime achievements usually account for 30% and the final exam paper accounts for 70%. Because the teacher needs to take into account the difficulty and discrimination of the papers, he usually needs to delimit the scope of students before the exam. Many students can pass the exam only assaulting before the exam. Students master the operating system course too one-sided, and that deviates from the aim of teaching. Therefore, it is necessary to adjust the proportion of the results and the final results, to improve the proportion of peacetime performance and to pay attention to the cultivation of students' ability in peacetime teaching. Increasing the mid-term examination and on-site testing links are good ideas. In the scene of the testing process, just like the enterprise interview, the students interview assessment one by one so that teachers can understand each student. Whether the students really master the relevant knowledge is at a glance. In the course of practice, the students are divided into several parts and each experiment is evaluated separately. The practice is evaluated with the combination of homework.

It is necessary to take the market as the guidance and strengthen the cultivation of learning ability and professional ability. The traditional teaching system based on the theory teaching has been unable to meet the needs of the talents training of Finance and economics. The students with weak ability cannot meet the needs of the market. In order to meet the market demand for talents and overcome the traditional course teaching too much emphasis on the basic theory, the market orientation should be permeated in the teaching process, curriculum, assessment and other aspects. For example, the teaching content should be discarded if it is important but too old. The related content of Linux operating system should continue to increase the proportion in teaching due to market demand. Besides, in the usual teaching, the practical experience of the engineer should be invited to go into the classroom and the software designer. They do the teachers appointment courses, pass the demand of the enterprise to the students and teach the software development and maintenance experience. So students can easily grasp the pulse of the times and know the goal and direction. In the assessment, it is necessary to increase innovative ability test, so that students are more motivated to enhance their practical ability.

Conclusions

Operating system has always been the core curriculum of computer science and has a pivotal role in the professional system. Therefore, it is necessary to carry out the teaching reform of the operating system course and make it more in line with the needs of the financial computer professional and to meet the needs of the market. This paper discusses the reform of operating system curriculum from the aspects of theoretical teaching content, teaching means and methods, experimental curriculum and assessment methods. Some progresses have made through the reform.
and practice of operating system course teaching. In the future, we will continue to be combined with other teaching theories for further teaching reform of operating system curriculum to improve the learning effect.

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References


