Research on Experiment Teaching Practice of Computer Network Security Course

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Abstract: Considering that the computer network security experiment teaching is not good, and it is not conducive to improving the students' computer network technology level, this article will base on the computer network security course, focus on analyzing the current situation of the current computer network security course experiment teaching, and clarify the existence of the experiment teaching Questions, and then explore how to reform the experimental teaching of computer network security courses, and put forward feasibility opinions, hoping to play a role in improving the experimental teaching of computer network security courses.

1. Introduction

Computer network security is a very practical subject, involving a wide range of knowledge, complex content, and greater difficulty. If you do not practice it yourself, it will be difficult for students to understand and master basic theoretical knowledge. More importantly, experimental teaching is more intuitive, time-sensitive, comprehensive and innovative than theoretical teaching. It is an important teaching link to achieve the goal of quality education and innovative talent training. Experimental teaching plays an important and irreplaceable role in strengthening the quality education of students and cultivating innovation ability. Next, this article will study the experiment teaching of network security course from five aspects: experiment platform, virtual platform, experiment content, experiment mode and experiment method.

2. Current Status and Existing Problems

The goal of computer network security experiment teaching is to cultivate students' practical application ability. Based on the mastery of various network attack technology principles, students can plan and design security solutions for network applications in different environments, and implement effective network security management . However, simply using the laboratory to build a local area network for experimental teaching cannot meet the requirements of this training goal. In summary, the following main problems exist in the current experimental teaching process.

2.1 The Experimental Hours Are Relatively Short.

At present, most colleges and universities still focus on theoretical teaching, supplemented by practical teaching. Take the author's school as an example. Of the 48 hours of computer network security courses, theoretical teaching occupies 40 hours, and experimental teaching only 8 hours. Teachers can only cover a relatively limited number of network security principles when designing experimental projects. What students actually encounter The network security problem is likely to be a collection of multiple problems, which also leads to the problem of scattered experimental content and single experimental project.

2.2 The Particularity of the Experiment Content.

Computer network security experiments are likely to cause irreversible damage to the hardware or software of the computer system in the laboratory. Installing the restoration protection card makes the experiments that require a specific configuration impossible. However, if the restoration

　　　89

protection card is canceled, it may cause abnormal phenomena such as slow operation, crashes, deletion of files, changes, or large-scale copying of the computer system, or even system crashes. Thereby affecting the experimental teaching of other courses.

2.3 Uncertainty of Experimental Effects.

One is the centralized experimentation, which easily leads to frequent changes to the configuration of the computer system, infection of a variety of malicious codes, and failure of the experiment. The second is that the experiment requires coordinated operation of multiple computers, such as a distributed denial of service attack process experiment. Students in a class are usually divided into about 40 students, and 2-4 people are appropriate. The number of groups should be at least 10 groups, which requires a lot of physical equipment. Increase the maintenance cost of the equipment, and the experimental effect is not clear.

2.4 Modeling the Experimental Process.

Most of the experiment process still uses the traditional way of teachers demonstrating that students follow the steps in the experiment guide. Even if students complete the experiment, they don't know how to solve specific problems. Such as data encryption software experiments, students can follow the software steps to master the basic principles of cryptographic algorithms such as DES, 3-DES, IDEA, RSA, MD5, and SHA, but they still don't know how to develop Web applications. How to apply these algorithms to strengthen security. It can be seen that the experiment has not achieved the effect of cultivating students' ability to discover, analyze and solve problems.

3. Build an Experimental Platform

Proficiency in the use of network tools, mastery of network management, testing and network security technology has a very important position in the teaching of computer network professional courses. In the computer network security teaching, because some experiments (such as offensive and defensive experiments) may have an adverse effect on the network environment, some methods should be adopted to eliminate or suppress this effect during the experiment. For specific experiments, building a special computer network platform can solve this problem well. In the constructed experimental platform, cryptographic tools, monitor tools, and network protocol analyzers can be used to make cryptography, virus Trojans, and network transmission data transparent. For example, three computers can be used to build a small local area network, to establish a project to obtain passwords using CAIN software, to obtain passwords through hacker software or to attack the security of computer networks through operating system and network vulnerabilities. Such an experiment allows students to obtain the login username and password of the FTP service vividly, which is of great benefit to students' understanding of the abstract concept of the network and the overall structure of the network. But it should be noted that the experimental platform must have a strong network access control function. After the experiment is stopped, it can automatically disconnect the experimental terminal from the network to prevent possible network attacks.

4. Application Virtual Platform

Due to the needs of management and maintenance, the computer in the laboratory is generally equipped with hard disk read-write protection equipment to protect the data on the computer from being changed at will. In computer network security experiments, we often encounter the installation of some security settings and security patches, software, etc., some settings and installations require restarting the computer, and the students do not have the permission to open the hard disk write, so they restart the computer Later, the system data was restored to the previous one, and the experiment could not continue. The contradiction between management and maintenance and experiment needs can be solved by using virtual machines in the experiment platform. Using

virtual machine technology in network security experiment teaching can carry out network attack and prevention experiments, such as the harm and prevention of Trojan horses, and the brute force cracking of passwords. Involving the use of some hacker tools (such as scanners, Trojan horse tools, etc.), using virtual machine technology, you can install multiple virtual machines, simulate the real network environment, and implement attacks and prevention exercises. Students further deepen their understanding of the importance and necessity of network security from the harmful effects of various attack tools on the computer system and the related preventive measures taken, thereby increasing their interest in computer security technology and receiving good teaching results.

5. Optimize Experiment Content

The first is to increase the proportion of design and innovative experiments in experimental teaching. The main content of the traditional experimental class is confirmatory experiment, by allowing students to master the most basic experimental configuration knowledge or protocol principle verification, focusing on the understanding of the principle. However, computer contents are updated with each passing day, and these contents are far from meeting the needs of cultivating innovative talents. In order to improve students' practical and innovative abilities, it is very necessary to add comprehensive and design-oriented experiments in the network experiment teaching, so as to stimulate students' innovative thinking and improve their innovative ability. Secondly, reduce the content of experiment report and data processing in experiment teaching. Experimental reports and data processing occupies a large proportion of traditional experimental teaching. In fact, these contents have little effect on students' ability training, which directly leads to the poor practical ability of many college graduates. Therefore, content such as experimental reports and data processing should be reduced, and the focus of experimental teaching should be shifted to the track of cultivating students' abilities. Third, differentiated teaching is implemented in experimental teaching. In actual teaching, it is necessary to fully consider the differences in the learning ability of students with different foundations, and pay attention to teaching students in accordance with their aptitude. Teachers need to design different experimental requirements for each experiment, divide the difficulty gradient for the experimental content, stipulate that the experimental content must be done and the experimental content selected, so that the different Students at all levels are able to complete tasks through hard work, allowing students to gain a sense of accomplishment in the experiment, thereby inspiring students' interest in learning. Finally, add cutting-edge scientific research content to experimental teaching. Appropriately increasing the frontier content of the subject will help students understand the development of science and technology and gradually master some methods of conducting scientific research. This is not only in line with the educational purpose of comprehensively improving students' comprehensive quality, but also in line with the training requirements of innovative talents in colleges and universities.

6. Effective Measures for the Reform of Experimental Teaching of Computer Network Security Course

Computer network security is a comprehensive course involving computer science, network, communication technology, cryptography and other disciplines. It has a wide range of knowledge and requires students in both theory and time. In this case, in order to make up for the lack of experimental teaching of computer network security courses in the past, effective measures should be explored to improve the teaching and increase the effectiveness of the teaching. So, how to do this? The author of this article refers to relevant materials and summarizes his own work experience, and the suggestions made are:

6.1 Building an Efficient Experimental Platform

Considering that the content of the computer network security experiment may have a negative impact on the computer in the laboratory, causing the computer to not be used normally, the experiment platform and environment of the university should be constructed to effectively balance

the contradiction between the management and maintenance of the laboratory and the needs of the experiment for better Create conditions for the development of computer network security experiment teaching. So, how to build a funny experimental platform? This needs to focus on strengthening three points, namely actual combat, that is, the experimental platform should be equipped with Web servers, database servers, mail servers, domain name servers, etc., information systems widely used in the Internet, so as to achieve a relatively real network environment for better computer development. Network security experiments create conditions; authenticity, that is, in the network attack and defense experiment environment and platform, attention should be paid to setting up a variety of real network security cases, and setting different security levels for each server system, which not only enables computer network security experiment teaching Good development can also effectively protect the security of the computer system; cooperation is to reduce the damage of the computer as much as possible and consume a lot of material resources. It is best to implement group experiments and let several students share a computer. Experiment operation and problem discussion, in order to obtain higher teaching effect.

6.2 Reasonable Design of Experimental Projects

The computer network security course has the characteristics of wide coverage and strong practicality, which makes this course require more experimental teaching activities. In order to improve the effectiveness and applicability of computer network security experimental teaching, while reforming this teaching, it is necessary to design experimental projects scientifically and reasonably. In other words, it is to meet the actual application requirements as the orientation, and the experimental platform supported by the virtual machine is used as the basis to plan and design the experimental project specifically, so that through participating in the learning of the experimental project, students can solidly grasp some knowledge and use this knowledge flexibly. Solve actual network security issues. In my opinion, the computer network security experiment items that can be set include common network commands, host security, network scanning, network attacks, Trojan horse intrusion, firewalls, etc.

7. Conclusion

I believe that in computer teaching in technical secondary schools, we should focus on stimulating students' interest in learning, cultivating students' innovative abilities and problem awareness, training students' innovative abilities, and laying a solid foundation for comprehensively deepening quality education.

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