

The Innovation of the Instruction Strategy for the Information Security Course Based on the Network Attack and Defense Training

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Abstract. In this paper, a novel instruction strategy for the information security training is proposed. Based on the Attack and Defense pattern training, the interesting of the students can be enhanced and the practical ability for tackling the exact information security problem can be improved. After the experiment throughout a semester, the efficiency of the instruction can be increased almost 17%.

Introduction

The information security is significant to the safety of every country. During the past decade, the number of the talents who grasp the information security knowledge is scarce but the requirement of these talents is becoming larger and larger. In this case, the universities or colleges should cultivate more corresponding talents to suit for the requirements. However, the current instruction strategy for the information security talents is stereotypical, which can not support the information security application. Many researchers [1-3] realized that the instruction strategy for the information security instruction should be different from any other courses. Namely, for the information security course, it should be training but not teaching. It implies that number of the practical courses should be more than the number of those theoretical courses [4-6]. However, how to find an efficient way to fulfill this viewpoint is difficult, which is reason from the fact that there are various instruction conditions in different college. It is difficult to carry out the training strategy in practice.

On the other hands, the interesting that the students give to these courses is one of key points to enhance the training efficiency. Although the training pattern is more interesting than those theoretical courses, how to develop the training process is also necessary. In this paper, we propose a novel training strategy for the information security courses instructions. In our method, the students are separated into various characters firstly, then each group of characters play the attack and defense game. In this game, in order to win, the various knowledge about the information security should be used. During this process, these knowledge will be concerned by students. In this case, they will learn the corresponding course more carefully. In the past semester, the efficiency increase almost 17%, which is evaluated by using the method proposed in [7]. In the next sections, the details of this instruction strategy will be discussed.

Sense Teaching

Scene teaching method is also called the situational teaching method, it is to point to in the teaching process, teachers purposefully introduce or create a certain emotional color, with image as the main body of the vivid specific scene, in order to attract the students attitude of certain experience, so as to help students understand the teaching material, and the development of psychological function so that the students can get teaching methods. The core of the situational teaching method is to stimulate students' emotion.

Scene teaching method in many teaching courses, especially in computer related courses have achieved good effect. And we design the scene teaching method is not directed against a particular course,

and with the principle of scene teaching method, for the whole system of information security personnel training to the overall reform of all courses.

Research contents belong to the category of teaching reform on the research of the teaching means and teaching method reform, using the scene teaching method principle, information security professional students into several groups, form a multiple "enemy, I" networks, at the same time, reforming the network teaching environment, using set different learning levels of virtual experimental network information security system. Students should not only ensure the security of "our" network communication, and to "enemy" network attack, to consider the hardware, software, and all the safety elements such as internal and external network environment. Through "scene teaching method", the student on own initiative into the whole teaching scenario, play Internet police, hackers, information security experts, the invaders, dissatisfaction with internal staff, such as different roles, graduated from the school to the professional knowledge in the learning process, to build defensive drills as a platform to network the most close to the real information warfare simulation environment. With such a special environment, students can broaden their thinking, fully demand oriented, arouse the students' interest in learning all kinds of information security technology, improve the level of actual combat, and cultivate a high level of information security engineering professionals.

The Character Separating. character playing is an important part of scene teaching, characters assignment study included the students into many groups; How many people in each group; Students in what grade or what stage grouping; Good record group, the difference in how to combine; Learn how long to exchange roles; What time does the regrouping according to the learning process, situation, etc.

According to the information security professional point analysis the principle of information security professional student role assignment, timing. Determine the units of interest group "enemy", the "I", should consider the diversity of information security teaching contents involved, and the presence of the complexity of the external and internal threats to network, according to the practical situation, students' learning level of the teaching content, such as reasonable grouping, assign roles. In our works, the characters are separated as follows. It is listed in Fig. 1:

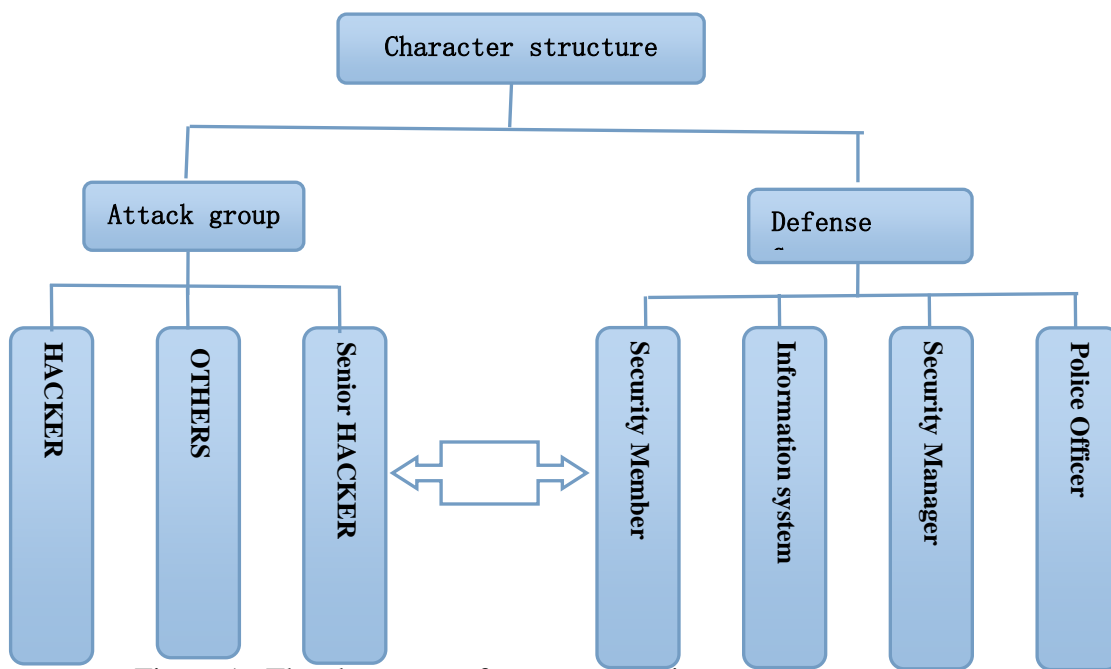


Figure 1. The characters of our proposed instruction strategy

The Character for the New Student

Information security professional students, the first year is the most basic knowledge. In computer basic teaching, understand the basic knowledge of network information security. At the same time, to recognize the student understand principle and significance of scene teaching, make students produce strong student interest. According to the characteristics of students, the students' primary role, teachers' overall coordination. Make the student group is reasonable, better adapt to the new learning content.

Process

This character separating process will be though all of the periods along 4 years.

Character Modifying

In order to ensure the students through the promotion of attack and prevent the dual ability training, a role play a year later, to adjust. Students from attack to prevent, from prevention to attack, with his shield out the spear, attack the enemy with the enemy's spear shield. In the end, adjust again, to return to their original role. Through the "tapping - anti - attack", "anti - attack - -" the transformation of learning, greatly improve students' practical ability. Students adapting to cross, give play to different group discussion effect independently.

Results

According to the experiments, which along with a semester, our training strategy obtain the increment of the instruction efficiency. Almost 17% is obtained by using the proposed instruction strategy.

Summary and Conclusion

Due to the diversity of information security of teaching content, at the same time, the presence of the complexity of the external and internal threats to network, according to the practical situation, students' learning level of the teaching content, such as reasonable grouping, assign roles will be the focus of the project should break through, the sooner so that the students into the role, the investment of the deeper role, will make the teaching better, can cultivate the practice ability of talents.

Curriculum system is a key factor of talent training, at present, a lot of teaching experts based on the curriculum system adjustment and the experimental system of building information security teaching reform, based largely on China's computer science and technology education "JiuSan" program and the department of defense "information security" PDRR model adjustments, which formed a basic theoretical and practical support., we introduce the whole process of information security engineering personnel training scenarios, the role of teaching and adjust to the new curriculum system, it requires theoretical support and practical effect of the test.

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