

# The Effect of Information Security Education Based on Cyberspace Security

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**Abstract:** Information Security is an Important Part of National Security. to Maintain Information Security, an Excellent Team with High Information Security Expertise is Required. This is the Basic Subject of University and University Information Security Education. It Has Become the First Level of Discipline in the New Era of University or University Information Security Education, But Unreasonable Curriculum and Theoretical Education and Practice Produce a Series of Problems Such as Decoupling. Analyze These Problems Concisely and Put Forward Appropriate Suggestions.

## 1. Introduction

In Recent Years, Information Security Incidents Emerge in Endlessly, and the International Struggle Around Information Security is Becoming Increasingly Fierce. Information Security Has Become an Important Component of National Security[1]. in 2014, China Officially Established the Central Leading Group on Network Security and Informatization, Headed by General Secretary Xi Jinping. General Secretary Xi Pointed out That “Information Security Has Become an Important Part of National Security, and the Construction and Maintenance of National Important Information Systems and Infrastructure Need a Construction and Management Team with High Information Security Expertise.” in Recent Years, the Demand for Information Security Professionals is Also on the Rise. in Order to Meet the Needs of Information Security Talents in China, the Ministry of Education and Universities Have Launched a Series of Personnel Training Work. in 2001, Wuhan University Set Up the Major of Information Security and Began the Training of Undergraduate Information Security Professionals. At Present, There Are about 122 Colleges and Universities Set Up Information Security Related Majors, Including 92 Information Security Majors, 18 Information Confrontation Majors, 12 National Secret Colleges and Related Secret Management Majors, Which Can Provide about 10000 Graduates of Related Majors Every Year. Although There Are Many Graduates or Practitioners of Information Security in Recent Years, There is Still a Large Talent Gap in the Face of the Increasingly Urgent Needs of the Country. According to Statistics, the Number of Information Security Level Protection Important Information Systems in China Has Been Rated At More Than 50000, and the Gap of Information Security Professionals is More Than One Million. the Number of Talents is Still Difficult to Meet the Current Demand[2]. in Addition, the Current Information Security Education Major in Colleges and Universities in China Has Not Yet Formed a Standard and Authoritative Curriculum System, Only Focusing on the Theoretical Knowledge Learning of Students, for the Real Problem-Solving Ability Training is Relatively Insufficient, Resulting in Low Quality of Talent Training. Therefore, in the Current New Social Environment and Needs, It is Necessary to Explore the Education Methods of Information Security Specialty.

## 2. University Information Security Education in the New Era

### 2.1 Development of Information Security Education

The United States is at the forefront of information security education. At the end of the 20th century, information security awareness education in the United States clearly put forward the strategic orientation of information security personnel training, defined as a series of government

documents issued in the past 20 years to determine the national information security strategic framework[3]. In 2000, the U.S. government published the top 10 national information security development plans in the 21st century. In 2003, the U.S. government proposed a national strategy for Cyberspace Security, namely, the National Cybersecurity awareness and training program[4]. The “cyberspace policy evaluation” of the United States is to strengthen online education, expand the level of federal technical personnel required by the 2017 release of the “federal government to strengthen the network and important infrastructure network”, in a series of development evaluation conclusions and recommendations report and necessary[5]. The American Society for information technology in higher education and the national network base security alliance have launched a special competition to promote information security education by establishing special websites and other activities. At the same time, they also participate in the activities of increasing information to various Internet users, such as schools, enterprises, families, etc. Security awareness, education and training promote the establishment of university or university courses, the organization of seminars and other methods to improve students' awareness and ability of information security, so that most universities in the field of IT services, information security offices are established, and relevant information security professions are held.

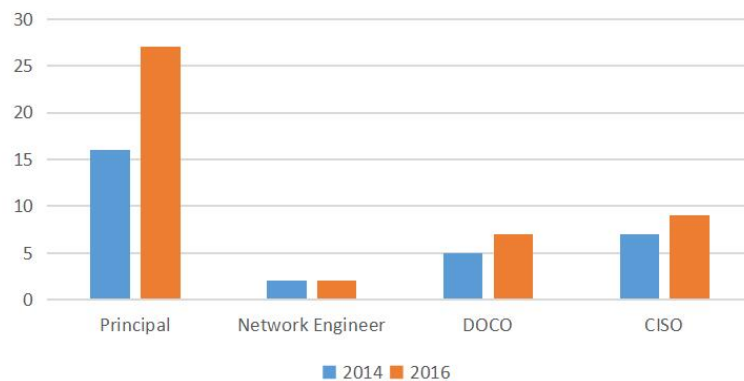


Fig.1 The Highest Statistical Accounting in Charge of Information Security in Colleges and Universities

## 2.2 Information Security Education in China

In 2001, Wuhan University established the first national information security department project. In 2002, the Ministry of education and culture approved the establishment of information security projects in 18 universities[6]. In 2003, the China office put forward the opinions on strengthening information security. It is clearly pointed out that the training of information security personnel is an important work to strengthen national information security. After that, 122 years of development of schools across the country set up information security related majors, and more schools also provide information security related courses, and many talents are the needs of China's information security related industries, so they have been booked.

## 3. New Forms of Information Security Education

### 3.1 Cyberspace Security

The concept of Cyberspace Security was first proposed by the United States. The National Institute of standards and Technology (NIST) defines “the strengthening of important technical facilities as the process of preventing attacks, discovering different attacks, and protecting information. Cyberspace Security can be regarded as an important part of information security, but it also includes some unique content, which is a new form of information security. In 2010, the United States began the national cyberspace security education program (NICE) led by the Department of national security and safety (DHS), the Department of Defense (DoD), the Department of labor (DOL), and the Department of Education (doed). Department of Justice (DOI), National Security Agency (NSA), National Science Foundation (NSF), director of national

intelligence (ODNI), office of human resources (OPM) and SBA are jointly responsible[7]. The plan is to standardize and systematize the three areas of information security common sense, formal education, vocational training and popularization of certification for the purpose of strengthening the overall layout and actions of the implementing country through the comprehensive improvement of the information security capabilities of the United States. The launch of the national cyberspace security education program marks the new era of information security education in the United States and the formation of a new pattern of information security education. In 2011, the National Institute of standards and technology published an excellent strategic plan, which includes three goals: first, please raise awareness of the dangers of online activities on the Internet; second, please expand the pool of experts that can support network security; third, please develop and maintain a globally competitive Cyberspace Security team. The second goal is to focus formal education nationwide, including basic education, high school education and higher education (college students and graduates) and higher education, in order to meet the goal of increasing the number of people with technology[8]. In order to find excellent talents in the research and development of Cyberspace Security, there are four topics. Considering the starting point of this article, here is a brief discussion about higher education: in nice, the number and quality of Cyberspace Security courses need to be increased in the process of degree training in higher education. In addition, it is necessary to increase the proportion of comprehensive safety related courses in Colleges and universities. At the same time, by improving the enrollment rate of graduate students in professional disciplines, training more professional talents, increasing the opportunity to obtain doctoral degree, improving the quantity and quality of research and development, the goal is directed to the government. Academic, and, individuals, open forums for companies to better identify issues that need to be studied. With the rapid development of Cyberspace Security Concept, China has also introduced corresponding policies[9]. In 2014, the center's network security and information-based leading group was established, with the area of Jinping chief. It was pointed out at the first meeting of the group: in the case of network security, national security is not guaranteed, there is no information, and modernization is not. In July 2015, China began to implement the new national security law, defining the concept of “cyberspace sovereignty” for the first time, and in June 2015, it was approved by the Ministry of education and culture of the people's Republic of China to propose “safeguarding cyberspace national sovereignty”. National security, as the first level of discipline, is the first level of national information security discipline. It defines the direction of information security personnel training, turns the edge, and completes humiliation under the condition of intensity. It embodies the national emphasis on network security and information security personnel training, and also marks the new era of information security education in China.

### **3.2 Network Security Competition**

In recent years, another new form of information security education is the emergence of a large number of network security competition. There are many forms of network security competition, such as CTF, fission competition and youth network security competition. Among them, the most common and widely used is the competition of CTF. CTF competition in the field of network security means the form of technical competition among network security technicians. The Defcon hacker conference started in 1996. Its English name can be directly translated into “capture flag” or “capture flag”. The general process is that the participating teams are provided with a lead on the string or other content of a specific form (so-called flag) through project analysis and other forms of string or other content, based on the contradiction of attack and defense in the competition environment. Give the organizer extra points for that.

## **4. Analysis of the Current Situation of Information Security Education in Colleges and Universities**

### **4.1 Subject of University Information Security Education**

With the development of the times, the information security education in universities has made

rapid progress, but there are still some new forms of problems in the new era. Most of the information security majors in universities and colleges are in the first level fields such as computer science, technology, information and communication technology, electronic science and technology, etc. Moreover, a small number are fixed in the first level fields, such as business school and management school. And there's a problem with the curriculum. Information security is not an isolated specialty, but a typical interdisciplinary specialty. In addition to its representative knowledge of computers and communications, it also includes relevant content in many fields, such as management and social sciences. Therefore, it is necessary to provide enough courses for the courses. Considering that the Western Connecticut State University in the United States, when setting up information security major, positioned it as an independent interdisciplinary major, including 15 general education courses, 11 business compulsory courses and 8 professional compulsory courses. However, information security personnel in China are attached to other primary level fields at the early stage of development, so the courses are often associated with their attached primary level fields. For example, the first level of computer science and technology related to the field of information security professional courses, computer science and technology are very similar, but communication engineering is linked to the information security profession, communication engineering courses and very similar. The pioneer of information security education in Wuhan University has also focused on computer science and technology related courses in the early stage of major setting, and has studied communication, mathematics and physics. In the process of the development of information security specialty in China, several places such as information security laws and regulations and information security engineering are gradually added to the curriculum system, and the cross knowledge of information security professionals is difficult to meet the needs.

#### **4.2 Separating Theoretical Learning from Practical Needs**

Information security, which is directly oriented to engineering applications, focuses on discipline. Sometimes, it is the unique feature of “the first problem found in the industry, the first community to follow up with good books”. In terms of information security education in universities and colleges, sufficient theoretical knowledge learning in the classroom can be ignored, and all kinds of specific problems in the real world are faced with the inability to exist in the real world. In the research on the curriculum of information security, the practice link is considered to be an important factor of the core curriculum, such as curriculum experiment, curriculum design, graduation practice, graduation design and so on. Some schools also organize internal small-scale CTF conferences to develop and strengthen practical skills of students. However, curriculum experiment and curriculum design lag behind the times and can not meet the actual social needs. Because of the time problem and the need of cooperation, it is difficult to treat graduation project and graduation practice equally in different situations. Therefore, in the information security education, in order to meet the actual needs of the society, it is still an important topic to establish a theoretical education bridge.

#### **5. Conclusion**

After nearly 20 years of development, new forms of information security profession have emerged. Now, it has entered a new era, but it also faces new problems such as unreasonable curriculum arrangement, utilitarian network security competition, theoretical learning and implementation. In view of the above problems, we give up providing necessary information, providing appropriate solutions, implementing university information security education suitable for the new social environment, and cultivating more reliable talents.

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