

# Exploration on the Diversified Cultivation of Cyber Space Security Talent in Higher Vocational Colleges under the Background of the Fusion of Production and Education

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## Abstract

General Secretary Xi Jinping pointed out in the network and information work symposium that network security has reached the level of national security, and its discipline construction and professional training has become a key topic in the field of education in recent years. Based on the background of the fusion of production and education, this paper explores the talent training mode from the forms of "1+X" certificate system and credit bank, with the topic of training talents for the majors of cyber space security (Information security and Management) in higher vocational colleges.

## Keywords

Higher vocational education; Security in cyberspace; The fusion of production and education; 1 + X; Credit bank; Teaching mode.

## 1. Introduction

As General Secretary Xi Jinping has pointed out, "Without cyber security, there will be no national security, and without informatization, there will be no modernization." To realize the great goal of cyber power, the core point is the reliable support of professionals. The fundamental influencing factor of cyber space security competition still lies in talents. As the core resource to promote national cyber security construction, the quantity, quality and overall structure of talents are the key indicators of national cyber space security soft power and core competitiveness. [1] In the overall environment, China's network security personnel still have a large supply gap, low professional quality, unreasonable structure and other problems, it is difficult to meet the urgent needs of maintaining national cyberspace security and building a strong network. [2] Vocational colleges in China follow the guidance of national policies and combine their own characteristics and current situation to carry out a variety of talent training modes, such as school-enterprise cooperation and three-education reform. However, there are still difficulties in school-enterprise cooperation, production-education integration and other aspects, such as lack of in-depth cooperation, lack of long-term cooperation mechanism, and absence of integration of "engineering" and "learning". How to train cyber space security personnel according to the national strategy and the social needs is an important issue that needs to be studied urgently in our university, various higher vocational colleges and even in the field of education.

## 2. Current Situation of Cyber Space Security Personnel Supply and Social Demand

By 2020, China's demand for cyber space security personnel will exceed 1.5 million. However, there are about 10,000 undergraduates and postgraduates and 20,000 junior college students in cyberspace security major (undergraduate and above), information security and

Management major (higher vocational or junior college) and related graduates in Chinese universities every year, so there is a big gap in talent demand. At the same time, the talent structure is still unable to meet the rapid development of the network space security construction needs in recent years, professional, compound, leading talent is extremely lack. [3] Based on the research and practice of many scholars, the author finds that there are mainly the following problems in the training of network security personnel in higher vocational colleges: (1) unreasonable teaching mode and teachers' conditions. It lays emphasis on theory rather than practice and fails to effectively cultivate students' practical ability, independent learning ability and innovative and creative thinking. In addition, there is not balanced benchmarking technology and industrial development in terms of discipline system, teaching staff, characteristic teaching materials, teaching modes and teaching resources in network security personnel training. (2) Talent training objectives and social needs are asymmetric. The subject of cyber space security focuses on actual combat and defense, while most higher vocational teachers lack actual combat experience, and the practical teaching environment and practical teaching materials are relatively scarce, which is the core dilemma of talent training. (3) Lack of infrastructure and platforms. The author found that in the teaching process of some colleges and universities, one of the aspects lacks the network shooting range platform of virtual environment, and at the same time does not have the real training scene. The extreme lack of basic teaching facilities can hardly meet the basic standards of experimental activities, which directly restricts the construction of network security discipline and the cultivation of professional, compound and leading talents.

### **3. The Realistic Appeal of Reforming the Training Mode of Cyber Space Security Personnel**

#### **3.1. National Policies to Promote the Innovation of Network Security Personnel Training Mode**

In accordance with the construction of network security professional standards issued by the state, the professional talents should have timely observation to capture the new trend and new trend of professional development ability, to professional cutting-edge knowledge, methods, and with the latest technology to keep a certain sensitivity, such as social media accounts that pay attention to the industry outstanding enterprises, and IT related means, from the process of information collection and learn to master data analysis and information management tools, methods, work for technology and management decision-making to provide the necessary technical support. At the same time, 《The General Office of the State Council on deepening the integration of production and education several opinions》, points out that in stepping up efforts to promote and deepen integration educational pattern, education helps to realize the education and cultivation of talents with entrepreneurship and innovation mechanism of high benefit and docking industry demand, to realize the core of the reform has the talent supply side effects, and conducive to the development of computer information technology in the present stage our country fast to meet the demand of talents under the new environment and promote education teaching level, broaden the students' employment, and boost the economic transformation of social information technology related industries and upgrade.

#### **3.2. The Predicament of Personnel Training Calls for the Innovation of Training Mode**

The teaching resources and teachers of network security in higher vocational colleges are relatively low, and they lag behind the market practice. Most of the teachers are "from school to school", lacking the practical experience of front-line positions in enterprises. [4] First of all, under the influence of the professional background, the cultivation of practical abilities such as

"Internet +" application, big data thinking and technology, etc. in network security major focuses on general education, which is not well connected with actual business. Secondly, colleges and universities have cognitive biases in discipline construction. They fail to closely analyze the real cases of industry development trend and actively observe and capture accurate, effective, long-term and stable data resources, so that the practical teaching links are not effectively cultivated. Thirdly, in terms of the construction of the teaching staff, the intensity and pertinence of the training activities for teachers are not enough, and there is a lack of rich experience in the on-the-job training and actual combat of enterprises. Fourthly, there is still a large space for students to expand their social practice and internship opportunities. Vocational students can hardly participate in the research of network security major related topics or the practical research of industry-university-Research projects.

Above problem is the biggest impact students' practical ability is poorer, the actual attack and defense level is not high and the lack of innovation and efficiency consciousness, can prompt the present network security professional personnel training mode of building, the construction of curriculum system, teaching staff construction there is still a large optimization space, is difficult to meet the unit of choose and employ persons and state the real demand for network security professionals. Higher vocational colleges are in urgent need of excellent enterprises with a high sense of social responsibility in the industry, so as to provide abundant resources for the "experimental field" of higher vocational colleges, take the integration of production and education as the leading mode, and promote the transformation of network security major to the application-oriented and composite talent demand direction in the era of "Internet +" and big data.

#### **4. A Brief Analysis of the Diversified Training Mode of "Network Security" Professionals under the Background of Industry and Education Integration**

Through the clear market reality demand for network security personnel and understand the student placement process encountered difficulties, to cling to the social development demand, improving the quality of personnel training as the core orientation, follow the professional network security policy, teaching reform and development, and student employment entrepreneurship cognitive knowledge, in-depth reform of teaching management and talent supply side principal direction and the main position, dominated by fusion education, our school and arnhem information co., LTD. Hangzhou in-depth cooperation, set up by enterprises specialized technical personnel teaching team, responsible for the students to participate in the project teaching and technical training, have obtained a good result, The results and graduation employment rate of the students in the network security industry competitions such as provincial and national skill competitions, "Qiangnecup", "West Lake Debating Sword", "Sip Triathlon" and so on have all increased significantly compared with the previous year. The following part discusses the author's practical considerations and functions of the 1+X certificate system and the credit banking system.

1+X Certificate System: 《The Implementation Plan of The National Vocational Education Reform》 clearly points out that vocational colleges should be the main body of the 1+X certificate system pilot, with the focus on alleviating the employment difficulties of computer-related majors and promoting the development of vocational education. [4] It encourages higher vocational colleges to take the initiative to connect industrial demands, professional positions and courses with cutting-edge technologies, so as to realize the integration of industry and education. Credit bank: Credit bank system is the innovation of traditional credit system. Students earn credits through various forms such as 1+X certificate system, enterprise practice research and social volunteer service, and deposit them into the "bank" and replace

them with credits of corresponding courses, so as to overcome the difficulties in learning and stimulate their interest in learning. [5]

## **5. Ways and Methods of Cultivating "Network Security" Talents under the Background of Industry and Education Integration**

### **5.1. Deepen the "1+X" Certificate System and Promote the Cultivation of Practical Ability**

Based on the orientation of the school and the discipline construction of information security and Management in our school, taking the characteristics of students as the entry point, and based on the background of the integration of industry and education, the teaching requirements of the major and the assessment requirements of "1+X" vocational skill level certificate are integrated in terms of time, space and content. In addition, both parties agree to establish the school-enterprise cooperation mechanism.

First, develop a modular curriculum system for school-enterprise cooperation. The enterprise to talented person's demand as the first goal, each reference 1 + X certificate requirement modular curriculum system, establish a corresponding to the professional profession level counterpart, layered, graded and curriculum system, and improve the module cohesion entrance, combined with the enterprise standards, industry standards, international standards making primary, intermediate, and advanced teaching material; Reading to students and social demands for talents of network security, to develop the teaching content, at the same time corresponding professional qualification certificate (industry) standards, encourage students to learn the license can be directly related to occupational qualification certificates at the same time, help the enterprise directly without training of card mount guard to obtain employment, so as to promote the competitiveness of the higher vocational graduates employment, and the realization of cultivate applied talents to meet the market demand.

Second, improve the conditions of the training platform to support the operation of the "1+X" certificate. According to the 1+X evaluation standard for students' vocational and technical skills, relying on the faculty team and enterprise technical resources, the conditions of the training room are improved, and the practical training platform (such as the network shooting range) is constructed with the cultivation of students' practical ability as the leading role, so as to carry out practical operation learning through the real business cases provided by enterprises. Combined with the results of practical training, analyze the employment competitiveness of students, encourage them to participate in vocational skill level certificate assessment, in order to constantly improve the employment competitiveness; The enterprise regularly assigns the technical team responsible for school-enterprise cooperation to return to school to check the practical training situation and put forward Suggestions for rectification and optimization. Meanwhile, the cutting-edge information of the industry is introduced into the school to further help students to indicate the learning direction and clarify their own needs, so as to improve their learning enthusiasm and provide opportunities for teachers' teaching mode reform.

### **5.2. Integrate Credit Banking System to Stimulate Students' Innovation and Efficiency**

To establish credit Banks in higher vocational colleges, it is necessary to distinguish them from other types of colleges and give full play to their characteristics and advantages. First of all must be based on unit of choose and employ persons work to build the corresponding curriculum system, fixed corresponding system, establish a "credit bank" and the fusion education training mode of corresponding institutional system, the teaching goal by enterprises, colleges and universities teachers and excellent instructor alumni representatives (two years experience in

security industry), according to the reform policy and develop as a specific study plan outline of guidance.

First, build a credit bank storage platform. The author carries out the credit accumulation platform and operation plan by referring to the credit upgrading system of THE American Higher Education and Korea Higher Vocational Colleges. Firstly, the limitation is broken down. Students are allowed to set the credit storage time by themselves for sustainable storage, and they can also suspend their study and retake in combination with practice. When the academic weight reaches a certain standard, they can be rewarded with corresponding professional qualifications. The qualification certification of the cooperative enterprises is the main thing. If the qualification standards are met and the achievement examination standards of the colleges and universities are met, vocational qualification certification can be issued. The credits stored above not only include course credits, but also include the scores of students' participation in enterprise practice activities under the integration of industry and education.

Secondly, a credit replacement system should be established. According to the teaching objectives jointly formulated by schools and enterprises and referring to the reform demand points, the range of credit conversion ratio between course learning and enterprise practice shall be set. Tutors from both schools and enterprises shall guide students to make teaching objective plans and specify the credit conversion ratio of their participation in school-enterprise practice activities. In order to meet the graduation requirements (including applying for early graduation) and appropriately relax the exchange standards, students can exchange course credits and enterprise practice achievements in the credit bank, and the enterprise practice achievements cannot be exchanged into course credits. Meanwhile, in order to prevent students from escaping from corporate practice by credit replacement, the total amount and times of credit replacement should be limited for all. In addition, in order to stimulate students' awareness of innovation and effectiveness and encourage them to develop courses and extend their practice, according to the amount of credits stored and the structural proportion of credits earned, students can apply to colleges and universities for diversified credit replacement incentive methods and enterprises for diversified practical achievement evaluation system.

### **5.3. The Coupling Point and Function Embodiment of "1+X" and Credit Replacement Mode**

1+X is the visual cultivation result of students, schools and enterprises, and its operating system is highly related to the credit bank. During the course of training and qualification, the credit bank activities under the 1+X certificate system take credits (or achievement points) as the carrier and flexibly use the results of practical training to promote the two-way certification and conversion of "1" -- educational background education and "X" -- vocational skills qualification certificates in the 1+X system. Both of them unify the course system, the course credit certification and replacement standards, and store the assessment of learning results in the credit bank. If they meet the standards, they can obtain the academic certificate or skill qualification certificate. 1+X lays the foundation for the practical training platform of the credit bank. Students can continue to participate in the in-depth practice activities of the enterprise based on the skill level certificate obtained on the basis of the level or type of courses; if a student has obtained a diploma, he/she can be exempted from the corresponding contents of the vocational skill level certificate examination of the same level. The training mode of the credit bank and the "1+X certificate" system is coupled. Firstly, the enterprise training is truly integrated into the talent training system. Secondly, it can effectively break the limitations of students' career planning under the school-year curriculum system, promote them to participate in enterprise practice as soon as possible, integrate into the real professional industry more quickly, obtain high-efficiency training of vocational skills, and meet the practical needs of the country and society for network security talents.

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