

Research on the Construction of Training Base for Information Security Technology Application Specialty under the Background of Industry-education Integration

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Abstract. Since the release of the "National Vocational Education Reform Implementation Plan" in 2019, the research on the construction of training bases for the industry-education integration in various vocational colleges has gained increasing traction, and has been actively explored in the industry-education integration, school-enterprise cooperation, integration of courses and certificates, and integration of courses and posts. Shandong Electric Power College has actively responded to the national vocational education reform policy since 2021, and has set up the information security technology application (school-enterprise cooperation) major. Through two years of school-running experience, combined with the training needs of cooperative enterprises, the experience of participating in skill competitions and the qualification of skill level certificates, it proposes a construction plan of information security technology application professional training base under the background of industry-education integration.

Keywords: higher vocational colleges; industry-education integration; information security; training base

1 Introduction

In 2019, the State Council issued the "National Vocational Education Reform Implementation Plan" pointing out that it is necessary to promote the construction of 300 high-level professional production and education integration training bases with radiation leading role [1]. The Action Plan for Vocational Skills Improvement (2019-2021) proposes to strengthen the basic capacity building of vocational skills training, support the construction of industry-education integration training bases and public training bases[2], strengthen the construction of vocational training institutes, and actively promote the co-construction and sharing of vocational skills training resources. The training base is an important platform for talent training, scientific research development, social service, technological innovation and cultural inheritance in vocational colleges[3-4]. The construction of training base is related to the development of vocational education. Therefore, it is of great significance to study the construction of training base under the background of integration of production and education, which is of great significance to cultivate talents with high quality, innovation and compound characteristics in the new era [5].

Taking the information security technology application (school-enterprise cooperation) major of Shandong Electric Power College as an example, the talent training program is revised, the construction idea of training base is determined, and the curriculum system and curriculum resources are improved by connecting the requirements of main post groups and skill competitions.

2 The necessity of information security technology application professional training base construction

Shandong Electric Power College actively promotes vocational education and vocational training. At present, it undertakes the majors of information security technology application (school-enterprise cooperation) in vocational education, information system operation and maintenance, communication operation and maintenance, big data and artificial intelligence in vocational training. Among them, the vocational training is carried out earlier, and the training room is mostly planned and designed based on the needs of vocational training. The information security technology application (school-enterprise cooperation) major is the first enrollment in 2021, mainly relying on the existing vocational training room to carry out professional training courses, lacking professional training pertinence. Therefore, it is urgent to study the construction of information security technology application professional training base under the background of industry-education integration.

2.1 Conform to the needs of information security personnel training

The report of the 20th National Congress of the Communist Party of China proposed to accelerate the construction of a network power and digital China. With the acceleration of the construction of network power and digital China, it has become an important task to build a large-scale, reasonable structure and excellent quality talent team. However, for a long time, the gap of network security talents in China is very large, and the contradiction between supply and demand is prominent. According to the latest statistics, the total demand for network security talents in China is more than 1.4 million, and the social demand is nearly 50,000 people per year, but the network security talents trained by colleges and universities are less than 30,000 people per year[6]. At the same time, compared with other disciplines, network security has the characteristics of practicality and timeliness. Therefore, in order to better cultivate practical talents, we should also strengthen practical and practical work while teaching theory.

2.2 Improve the employment competitiveness of graduates

At present, China's colleges and universities set up network security related majors, including cyberspace security, information security, security technology, information confrontation technology, network security and law enforcement and other professional names. Since Wuhan University first set up a special undergraduate major in information security in 2001, nearly 200 universities have set up network security related majors[7]. From the current employment situation, although the demand for network security talents in various industries is large, vocational college graduates are still in a weak position in employment. Therefore, more participation in professional practical training, participation in vocational skills

competition, and all-round improvement of practical level can better improve the post competitiveness of graduates.

2.3 Improve the pertinence of the use of training resources

The school takes into account both vocational education and vocational training. The vocational training cycle is short and the training room turnover is frequent. It is often necessary for vocational education to replace the training room to make way for vocational training, which affects the consistency of vocational education training courses. Therefore, it is necessary to integrate and reconstruct the existing training room, plan the training resources as a whole, and make the resource allocation of the training room more targeted.

3 Basic ideas of information security technology application professional training base construction

Based on the school-enterprise cooperation training mode of information security technology application specialty in our school, combined with the professional characteristics of our school, this paper puts forward the construction idea of training base under the background of industry-education integration : formulating the practical teaching goal of " four integration " of information security technology application specialty, constructing the practical teaching system of " cognition-skill-application-innovation-development " five levels, and building the " two centers " and " five in one " training base of industry-education integration inside and outside the school, as shown in Figure 1.

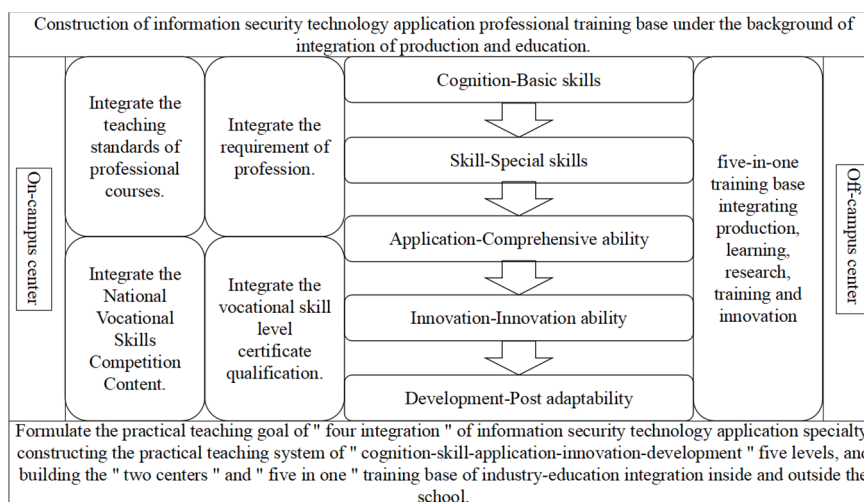


Fig. 1. Basic ideas of information security technology application professional training base construction.

3.1 To formulate the practical teaching objectives of " four integrations "

According to the teaching standards of information security and management major in higher vocational schools, the requirements of professional post groups for talent training are integrated, the competition contents such as skill competitions in vocational colleges are

integrated, and the qualification of skill level certificates is integrated to determine the practical training needs of the integration of " post, course, competition and certificate " of information security technology application major, and to formulate practical teaching objectives.

3.2 Construct five levels of practical teaching system

Relying on the advantages of the technical and skilled personnel training base of the State Grid Corporation of China, the government, school, enterprise and other resources are integrated to build an open and flexible vocational education and training system for the application of information security technology. On the basis of the "four integrations", the five levels of " cognition-skill-application-innovation-development " are designed, and the practical teaching links are concretized through rational allocation. According to the basic skills, professional skills, comprehensive application ability, innovation ability and post adaptability, the practical teaching system is constructed and the supporting practical teaching resources are developed.

3.3 Build a " two-center " and " five-in-one " industry-education integration training base inside and outside the school.

Combined with the practical teaching objectives, determine the hardware and software equipment and facilities required at all levels, and plan the practical teaching resources as a whole. Through the school-enterprise cooperation mode, the planning and design of the " two centers " training base inside and outside the school is completed, and a five-in-one training base integrating production, learning, research, training and innovation is created. Learn from the experience of advanced training base construction at home and abroad, do a good job in the top-level design of the training base based on the integration of production and education, school-enterprise cooperation, and rationally plan training resources to avoid duplication of construction and waste of resources.

4 Specific measures for the construction of information security technology application professional training base

The training base is a key area for cultivating students' skills, and it is also the intersection of the needs of the school and the social industry. It is also the vane of the school's educational philosophy and level. Therefore, the construction of training base needs to consider not only the learning needs of students, but also the employment needs of enterprises.

4.1 Course module design

According to the professional ability corresponding to this major, it is classified according to the professional position, and the professional direction course module is constructed. Each module corresponds to a professional position (group), which is composed of 3-5 professional core and professional expanding courses. The module is integrated with the skill competition project, and each module corresponds to the corresponding skill competition project and the vocational qualification certificate or vocational skill level certificate. It includes four modules:

Network security operation and maintenance management, Network security service, Web penetration test and Information system operation and maintenance. As shown in Table 1.

Table 1. Curriculum module design corresponding table

Serial number	module name	course name	course category	skill competition	vocational skill level certificate
1	Network security operation and maintenance management	Network Technology Training	Professional basic course		Network security operation and maintenance X certificate
		Linux application foundation	Professional basic course		
		Safety equipment configuration and debugging	Professional core course		
2	Network security service	Network security technology and training	Professional core course	1. National Vocational College Skills Competition “Information Security Management and Evaluation” 2. Information Security and Confrontation Technology Competition	Network Security Service X Certificate
		Linux application foundation	Professional basic course		
		Safety equipment configuration and debugging	Professional core course		
		Network attack and prevention	Professional core course		
3	Web Penetration Test	Web penetration testing	Professional core course		Network Security Penetration Testing X Certificate
		Binary and reverse engineering	Professional core course		
		Coding Technology and Cryptography	Professional expanding course		
4	Information system operation and maintenance	Operating system security reinforcement	Professional core course	1. BRICS Skills Development and Technological Innovation Competition” Enterprise Information System” 2. National Vocational College Skills Competition” Network System Management “	Network system construction and operation and maintenance X certificate
		Network Technology Training	Professional basic course		
		Java programming	Professional core course		

4.2 Top-level design of training base

According to the talent training program, the professional courses that students need to master during their study in school can be roughly divided into professional basic courses, professional core courses and professional expanding courses, which correspond to the two levels of cognition and skills in the ' five levels '. Apply the corresponding post internship,

vocational qualification certificate or vocational skill level certificate to integrate all kinds of knowledge and skills learned, and be able to use the skills learned in practical work and obtain corresponding qualifications. Skills competitions such as innovation corresponding skills competition, BRICS skills development and technological innovation competition can use innovative thinking on the basis of application, successfully complete the competition and achieve good results. The final development corresponds to the skills training courses set up to meet the professional needs after the new entry or work. The corresponding relationship between them is shown in Figure 2.

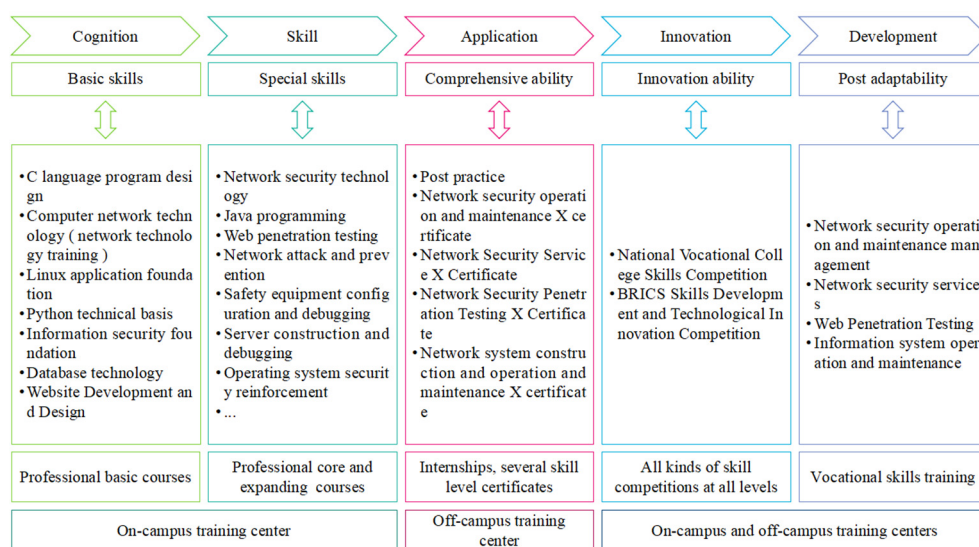


Fig. 2. Top-level design of training base.

4.3 Construction of teaching staff and curriculum resources

Through the overall construction of the training teachers inside and outside the school, a high-level "double-qualified" mixed teacher team with "exquisite skills and combination of full-time and part-time" is built by inviting in and going out. Combined with the job situation of information security technology application specialty, the action-oriented project-based skill training mode is studied. In the teaching process, the project is used as the carrier, and the project teaching method is used as the main teaching method to integrate the ordered course content, reorganize the course structure, create the teaching situation, integrate with the enterprise project development, and improve the students' practical ability and innovation ability by completing the learning task.

4.4 Construction of evaluation index system

According to the results of work task analysis, the evaluation index of professional ability of information security technology application specialty is defined, and the weight of evaluation index of professional ability of information security technology application specialty is determined. The current professional education ability of information security technology application specialty is analyzed, decomposed and classified. Qualitative analysis of the

structure of vocational education students ' ability composition and evaluation content, improve the evaluation standard system of professional ability of information security technology application specialty, and construct the evaluation index system of professional ability of information security technology application specialty.

5 Conclusions

This article refers to the content of the “National Vocational Education Reform Implementation Plan “ and the Vocational Skills Improvement Action Plan (2019-2021), combined with the professional characteristics of Shandong Electric Power College, and based on the principles of overall planning, integration of production and education, combination of work and study, and resource sharing, this paper gives the basic ideas and specific measures for the construction of information security technology application professional training base under the background of integration of production and education, which has certain reference value.

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