

Research on the Training Strategies for Applied Talents in Local Undergraduate Colleges----Taking Cyberspace Security as an Example

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Abstract. In response to the problems of vague positioning of training plans, emphasis on theory over practice in the training process, and relatively weak teaching staff in the cultivation of applied talents in local undergraduate universities, the reasons for these problems were analyzed using the cyberspace security major as an example, and a top-down talent cultivation path was proposed. Specific measures include the collaborative development of applied talent training plans by schools and enterprises, the integration of school enterprise resources to revise the curriculum training system, the selection of teaching content and mode, the exploration of student practical training and internship plans, the joint construction of various teaching resources, the improvement of teacher training system, and the joint construction of professional guidance committees by schools, local enterprises, and other specific measures.

Keywords: Applied Talents; School Enterprise Integration; Personnel Training

1 Introduction

The main task of application-oriented local undergraduate universities is to cultivate application-oriented talents, which is to cultivate people who can serve local industries and meet the needs of society[1]. New engineering has put forward new requirements for applied talents. For example, the cultivation of applied talents must be aligned with the needs of the industry and pay attention to the cultivation of students' practical abilities[2]. Applied talents need to have practical ability to solve complex engineering problems, strong technological application ability, innovation ability, and lifelong learning ability[3].

The cultivation of applied talents is beneficial for solving the supply-demand contradiction of higher education, improving the return on education, solving the structural contradiction of talent cultivation, and addressing the positioning of universities in serving local areas. However, in many local undergraduate universities, due to issues such as insufficient understanding of teachers, lack of communication with local enterprises, and weak faculty, it is not possible to cultivate qualified applied talents that meet social needs. Therefore, it is necessary to study the cultivation of applied talents in local undergraduate universities.

2 Research status

Using CNKI as the database, we searched for papers on applied talents in local undergraduate colleges in the form of subject words. The distribution of hot research topic words is shown in Figure 1.

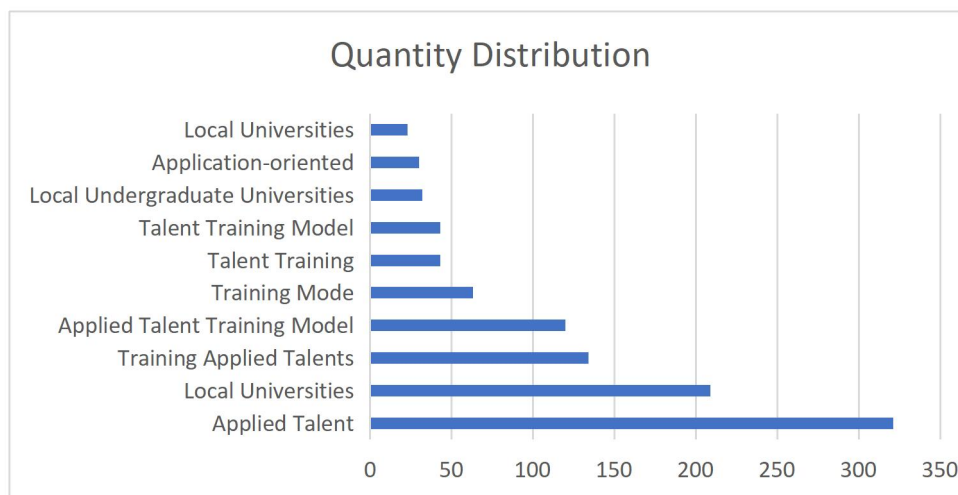


Fig. 1. Distribution of hot topic keywords in research

Many scholars have discovered the problems in the cultivation of applied talents and proposed solutions for their respective universities. Shao Bo et al. proposed a comprehensive reform strategy for talent cultivation guided by the new engineering education concept of "large courses, small projects, and all elements", taking Nanjing University of Engineering as an example [4]. Zhou Xudan et al. proposed the construction of a system for cultivating applied talents in universities based on the OBE teaching concept in response to the phenomenon of derailment and disconnection between educational development theory and teaching practice [5]. Song Shihua et al. explored the problems in the integration of industry and education in the talent cultivation of local applied universities and proposed the "four constructions and four integrations" model to build applied talents [6]. Sun Zhuoying takes the important requirements of the concept of cultivating applied talents in universities as the starting point, analyzes the current implementation of the concept of cultivating applied talents in universities, and constructs a development path for strengthening practical teaching work in schools [7].

3 Problems in Cultivating Applied Talents

Taking the cyberspace security major as an example, the teaching team conducted research and interviews with over 100 people through enterprise research, graduate interviews, and peer discussions, and discovered many problems in the process of cultivating applied talents in local undergraduate colleges. More than 50% of people believe that there are problems in talent cultivation, as shown in Figure 2.

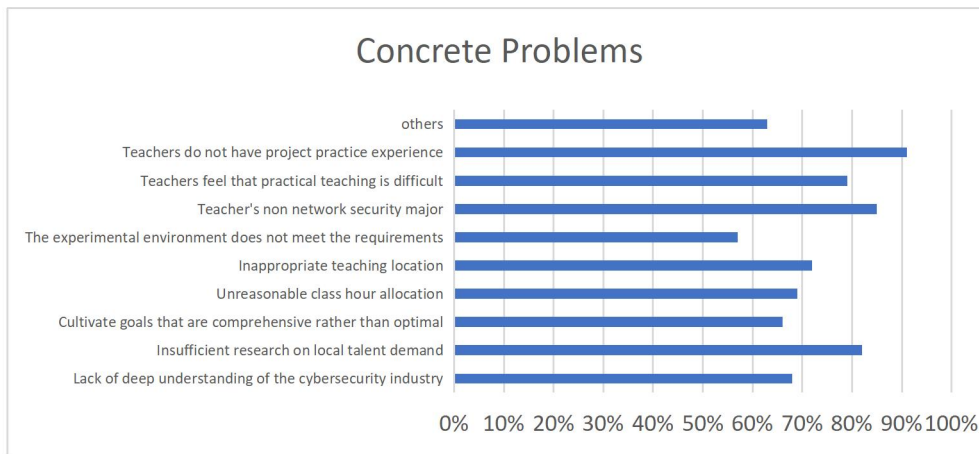


Fig. 2. Concrete Problems in Cultivating Applied Talents

The teacher summarized and proposed three key issues through analysis and integration, as shown in Figure 3.

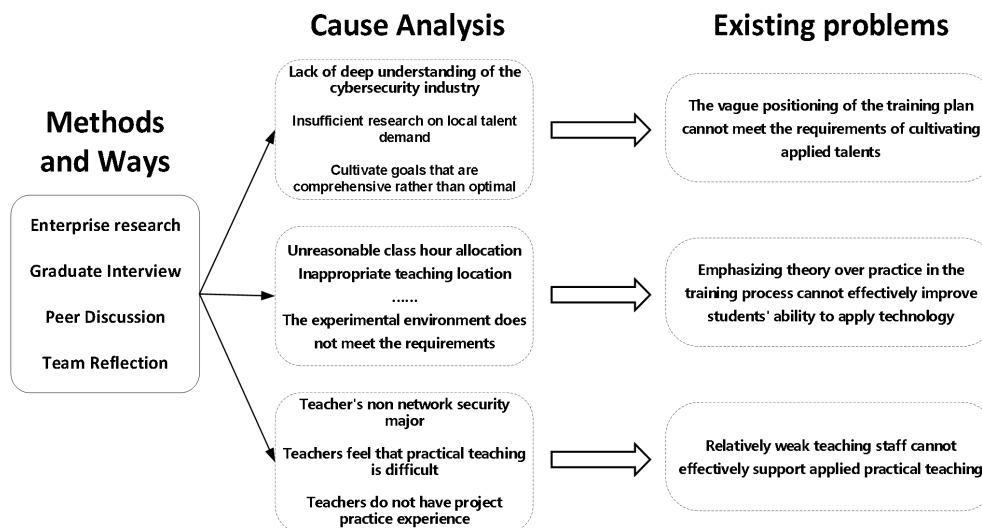


Fig. 3. Analyze and summarize three key issues

3.1 The vague positioning of the training plan cannot meet the requirements of cultivating applied talents

The development of the original talent training plan is mainly completed by professional teachers. Due to teachers' lack of deep understanding of the cybersecurity industry and insufficient in-depth research on the demand for cybersecurity talents in the local economy, the positioning of the training objectives and graduation requirements in the training plan is

unclear, and there is no clear expression of what kind of talents should be trained, what training objectives and graduation requirements students should achieve in order to meet the employment needs of enterprises.

Due to vague training objectives and graduation requirements, the construction of the curriculum system is unreasonable, resulting in a phenomenon of seeking perfection rather than optimization. What courses should be offered, how to allocate the theoretical and practical hours of courses, and how to cultivate applied talents that meet social needs have become the primary issues that plague professional construction[8].

3.2 Emphasizing theory over practice in the training process cannot effectively improve students' application technology ability

In the process of student cultivation, many factors such as class hour allocation, teaching location, teaching content, practical environment, centralized practice form, and the practical ability of teaching teachers restrict the implementation of practical teaching, resulting in a phenomenon of emphasizing theory over practice in the teaching process, which cannot effectively improve students' application technology ability. How to effectively combine theory with practice and enhance students' practical abilities has become a key issue that troubles professional construction.

3.3 Relatively weak teaching staff cannot effectively support applied practical teaching

The construction of the first level discipline of cyberspace security was relatively late, so most professional teachers come from computer science and technology majors. In practical classes, some teachers feel that there are certain difficulties due to the wide range of knowledge, strong professionalism, and high complexity involved in practical content. Especially, most teachers lack practical experience in real enterprise projects, cannot effectively combine theoretical knowledge with real projects, cannot effectively support practical teaching, and cannot achieve the ultimate goal of improving students' practical abilities. How to improve the teaching staff that meets the needs of applied talent cultivation has become a key issue that troubles professional construction.

4 Strategies for Cultivating Applied Talents

The college fully integrates with enterprises, deepens the integration of industry and education, implements school enterprise co education, and integrates resources from multiple sources including schools, local governments, and enterprises. The college aims to cultivate application-oriented technical talents who serve the local area, with the concept of engineering education certification as the cornerstone[9], and adopts a top-down approach to revise talent training plans, formulate talent training systems, and construct various teaching resources.

Through the implementation of many specific measures, such as determining training objectives and graduation requirements, developing course systems and credits, selecting teaching content and modes, exploring practical training and internship plans for students, jointly building various teaching resources, improving the teacher training system, and establishing professional guidance committees for school, local, and enterprise cooperation, the school and enterprise jointly build a "industry education integration, school enterprise co

education, multi-party collaboration, and goal oriented training model for cyberspace security applied talents". The talent cultivation mode is shown in Figure 4.

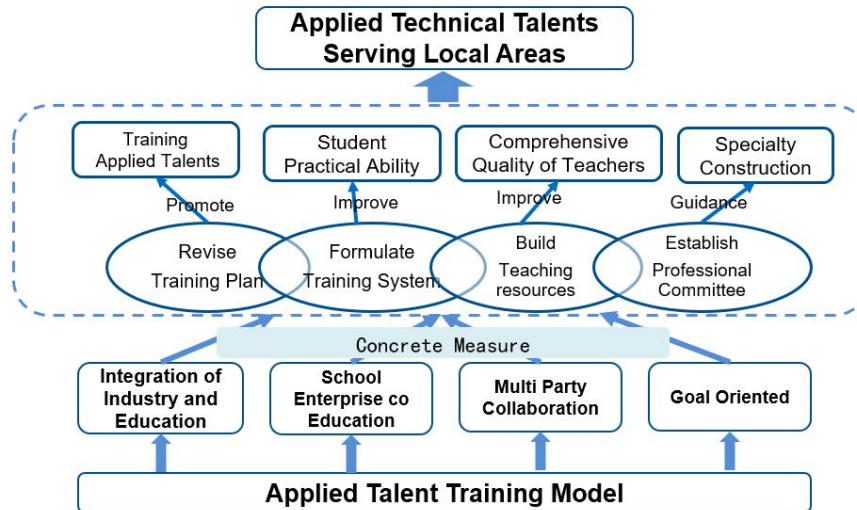


Fig. 4. Applied Talent Training Model

4.1 Revise training plans to promote the cultivation of applied talents

Under the principles of engineering education certification, "student center", "output orientation", and "continuous improvement", schools and enterprises fully understand the employment needs of network security positions in enterprises and public institutions, in response to the national cyberspace security strategy needs and local industry development needs. Based on the understanding and grasp of the enterprise's talent needs in the network security industry, schools and enterprises collaborate to develop applied talent training plans suitable for local undergraduate universities [10]. This includes determining training objectives and graduation ability requirements, developing a curriculum system, course credits, theoretical and practical credit allocation, arranging concentrated practice hours and content, etc., to ensure that the training program meets the quality standards of engineering education [11].

4.2 Develop a training system to improve students' practical abilities

The school and enterprise jointly participate in the design of a collaborative education and training system, including curriculum system, practical teaching system, and knowledge and ability quality cultivation. When setting up the curriculum system, it is necessary to take the job requirements of applied talents in enterprises as the starting point, extract the knowledge, skills, and quality requirements from them, and convert them into corresponding general education courses, professional basic courses, professional core courses, and professional elective courses.

At the same time, based on the curriculum, schools and enterprises jointly discuss the practical teaching of professional courses, such as which courses need to be offered, how to offer them, and how many class hours should be offered, all of which should be reasonably arranged and planned.

Especially, the practical teaching system should include four practical modules: course practice courses, concentrated practice at the end of the semester, enterprise internships, and enterprise internships. Enterprises and schools should fully leverage the advantages of both teachers, technology, and software and hardware resources to conduct in-depth discussions on the content, difficulty level, and teaching mode of the four practical modules and jointly complete their implementation. The training system for students is shown in Figure 5.

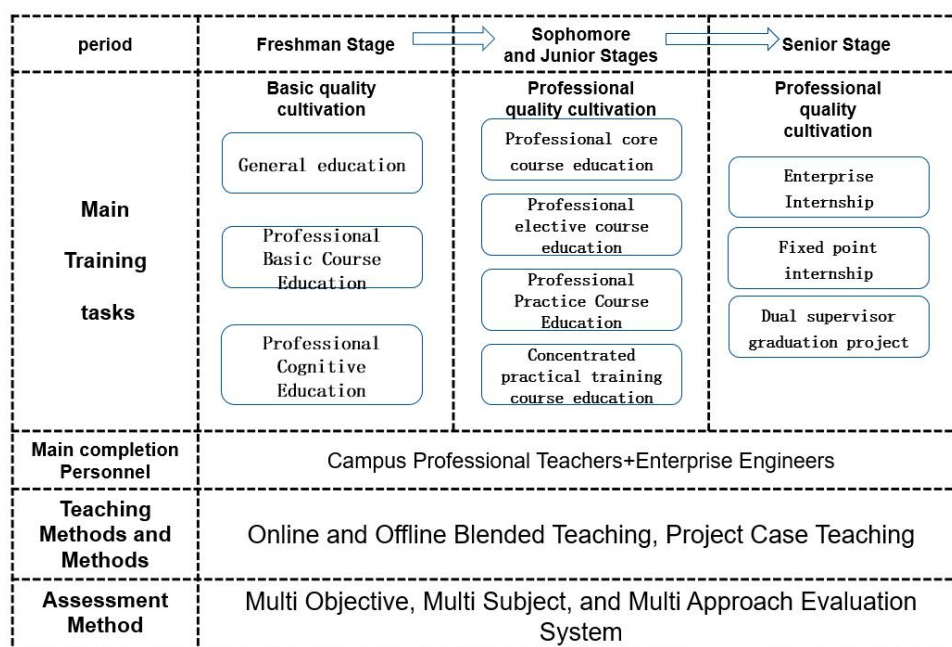


Fig. 5. The Training System for Students

In the process of talent cultivation, fully utilize online platforms such as SPOC or MOOC to promote blended online and offline teaching. We innovate teaching methods and actively promote personalized and autonomous learning for students. At the same time, a comprehensive evaluation system should be established with the participation of teachers and students, multiple forms inside and outside the classroom, and multiple objectives of knowledge, ability, and quality. According to the talent demand standards for enterprise positions, comprehensive and detailed assessment and evaluation rules are formulated from various aspects such as theoretical knowledge, practical skills, subject competitions, project practices, and the second classroom. A dual mentor joint evaluation mechanism composed of professional teachers and enterprise engineers on campus is adopted.

4.3 Building Teaching Resources to Improve the Comprehensive Quality of Teachers

The construction of teaching resources mainly includes the construction of ideological and political resources, the construction of teaching teams, the construction of new forms of practical teaching materials, the construction of experimental platforms, the construction of learning platforms, and the construction of innovation and entrepreneurship. By jointly building various teaching resources between schools and enterprises, the comprehensive quality of professional teachers on campus can be improved, especially their practical teaching abilities. As shown in Figure 6.

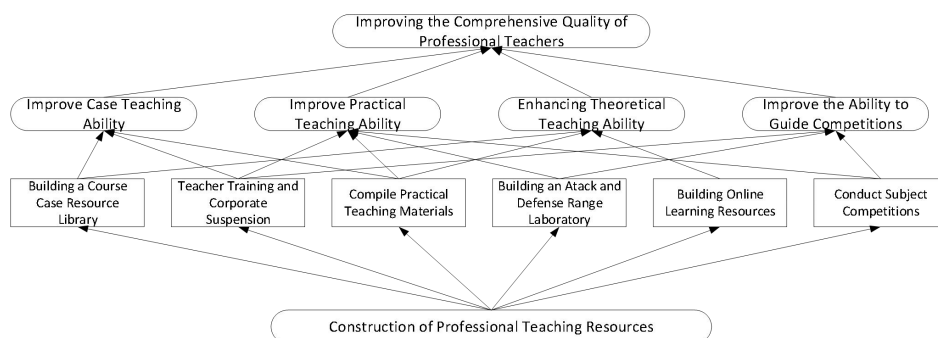


Fig. 6. Improve the Comprehensive Quality of Teachers

4.4 Establish a professional committee to guide professional construction

The school, local government, and enterprise joint construction professional guidance committee determines the top-level design of professional construction, determines talent training goals, and guides the specific implementation of each stage of professional construction[12].

The professional guidance committee conducts a comprehensive evaluation of whether the talent needs have been met, and evaluates the quality of graduates based on industry development trends. They provide a basis for continuous improvement of talent cultivation quality, guide the implementation plan of talent cultivation improvement, and supervise the implementation content and process of talent cultivation mode to continuously improve the quality of talent cultivation[13].

5 Application effectiveness

Since the joint implementation of application-oriented talent cultivation by the college and enterprises, the comprehensive quality of students and professional teachers has been improved to a certain extent.

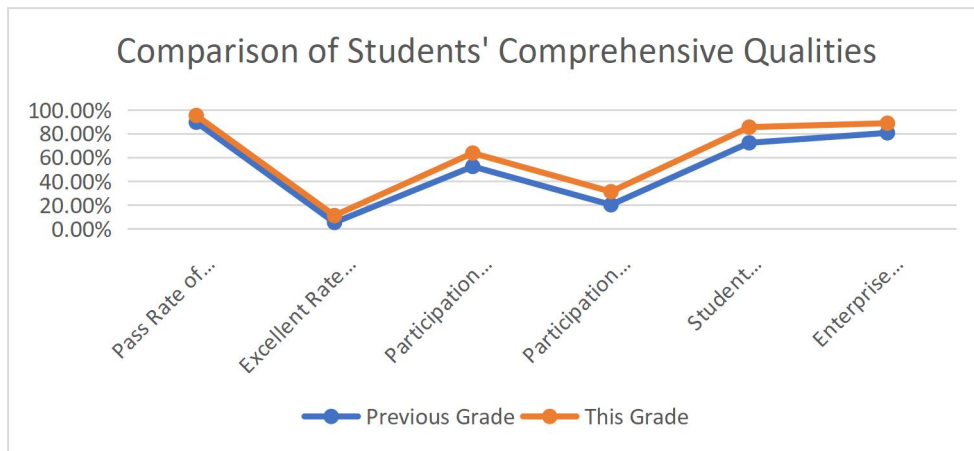


Fig. 7. Comparison of Students' Comprehensive Qualities

Compared with the previous class of students, the passing rate of professional courses, the excellent rate of professional courses, the proportion of students participating in subject competitions, the proportion of students participating in social activities, the employment rate of students, and the satisfaction of enterprises with student quality have all improved. The data is shown in Figure 7.

The team teachers have also achieved significant results in teaching and research, as shown in Figure 8.

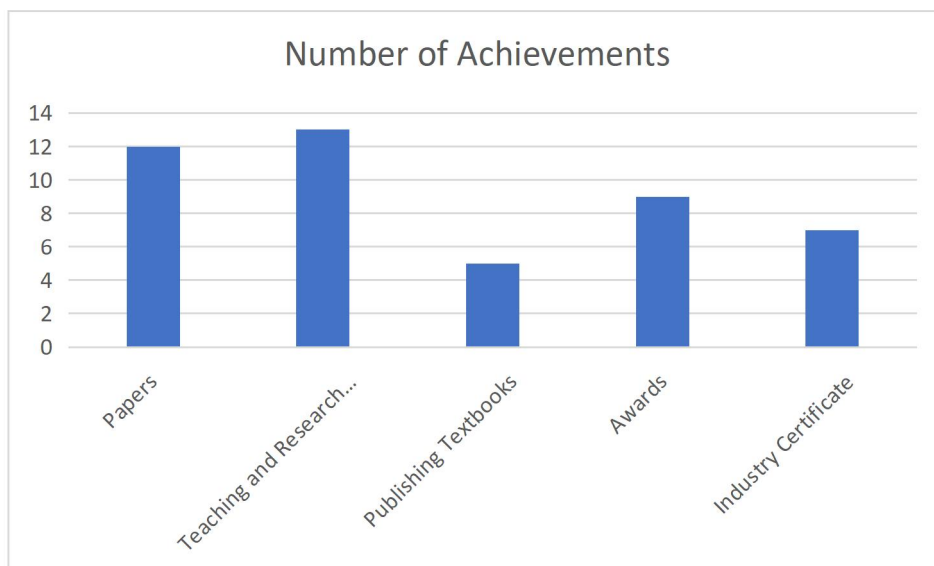


Fig. 8. Number of achievements achieved by teachers

6 Conclusion

Whether students meet social needs is not evaluated by universities, but by enterprises and institutions that need talents. Therefore, the cultivation of applied talents must be deeply integrated with enterprises. The cyberspace security major in local undergraduate colleges must be guided by the demand for cyberspace security talents from local enterprises and institutions. The college promotes deep integration of industry and education through school enterprise cooperation, school local cooperation, and collaborative education. The college is deepening the comprehensive reform of education and teaching, and achieving comprehensive professional cooperation between the school and enterprises throughout the entire process. Schools and enterprises jointly develop talent cultivation plans and curriculum teaching systems, jointly build a series of teaching resources, strengthen project practical teaching, and jointly cultivate new engineering network security application oriented talents.

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