

## **A new mode for Secrets Talents Cultivation through three Integration of “Strategy-Education, Science-Education, Industry-Education”**

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**Abstract:** With the strategic demands for national cybersecurity and information protection growing ever more prominent, the cultivation of secrets talents has become a crucial task for universities. Shandong Secrecy College of Qilu University of Technology bears the significant responsibility of supplying high-quality secrets talents for national and local sectors. This paper constructs a new mode for secrets talents cultivation characterized by “Strategy-Education Integration as the lead, Science-Education Integration as the enabler, and Industry-Education Integration as the driver”. It proposes specific implementation pathways, including reconstructing the curriculum system, building collaborative platforms, developing a dual-qualified teaching faculty, and optimizing the educational process. The aim is to provide a referential and replicable exemplary scheme for secrets talents cultivation in the new era.

**Keywords:** Strategy-Education Integration; Science-Education Integration; Industry-Education Integration; Secrecy Major; Talent Cultivation Mode

### **1. Introduction**

In the global digital age, cybersecurity and secrecy work have become strategic cornerstones for safeguarding national sovereignty, security, and development interests. Cultivating secrets talents who are politically reliable, technically proficient, and innovative is an urgent requirement for addressing the increasingly severe challenges in secrecy struggles and implementing the holistic view of national security.

However, traditional cultivation modes, often

characterized by being closed-off, theoretical, and singular, struggle to meet the interdisciplinary demands of the new era for secrets talents who possess both “specialized and broad knowledge, integrating theory with practice”. Currently, the cultivation of secrets talents faces three major dilemmas: firstly, a disconnection between talent cultivation and the guidance of the leading administrative departments, resulting in unclear training direction; secondly, insufficient integration between scientific research and teaching, making it difficult to transfer frontier researches into teaching resources and cultivate innovation capacity; thirdly, a disconnect between industry and teaching, leading to weak practical skills among students and difficulty meeting actual job requirements.

As the main platform for talent cultivation, universities bear the responsibility of educating talents for the nation. To resolve these dilemmas, this paper, taking the exploration and practice of Shandong Secrecy College of Qilu University of Technology as an example, constructs a new “Three Integration” mode for secrets talents cultivation composed of “Strategy-Education Integration, Science-Education Integration and Industry-Education Integration”.

Here, “Strategy-Education Integration” refers to the integration between national and local confidentiality administrative departments and university, ensuring the political correctness, clear direction, and practical relevance of talent cultivation. “Science-Education Integration” involves merging scientific research with university teaching to enhance students’ innovative ability. “Industry-Education Integration” denotes the cooperation between universities and enterprises in training secrecy professionals, strengthening students’ practical

skills. This forms a three cultivating mode led by Strategy-Education Integration, empowered by Science-Education Integration, and driven by Industry-Education Integration, aiming to establish a new pattern for secrets talents cultivation characterized by resource sharing, complementary advantages, and collaborative development.

## **2. Current Situation and Problem Analysis of Secrets Talents Cultivation**

Facing the secrecy major as an emerging disciplinary direction, existing secrets colleges in China are actively exploring its talent training models. For example, Wang Yongwei and Liu et al. discussed the construction ideas and innovative talent training schemes for secrecy management majors under the background of Emerging Engineering Education<sup>[1-4]</sup>. Zheng et al. analyzed the training model of secrecy management majors from a collaborative perspective<sup>[5]</sup>. Bai Xiaofeng et al. pointed out that in the current process of cultivating interdisciplinary secrecy professionals, problems exist such as curriculum system settings not adapting to interdisciplinary talent needs, lack of a stable secrecy professional teaching team and so on<sup>[6]</sup>.

Xu Donghua et al. promoted the construction of secrecy management majors from the perspective of New Liberal Arts development paths, continuously cultivating and supplying high-quality outstanding talents for China's secrecy cause<sup>[7]</sup>. Ma Shoufeng et al. proposed an elite interdisciplinary training goal for secrecy management majors, establishing a mission-driven innovative talent training mode for secrecy management majors<sup>[8]</sup>. Yue Hengli et al. proposed a characteristic professional training model for commercial secrets<sup>[9]</sup>. Huang Weiqing et al. analyzed the integration and expansion of the technical direction of secrecy management majors with the cyberspace security discipline<sup>[10]</sup>.

However, the current process of secrets talents cultivation faces many problems that need urgent solution.

Firstly, the depth of guidance from secrets administrative departments is insufficient. Currently, cooperation between universities and secrets administrative departments often remains at a macro level. A mechanism for the deep guidance, supervision, and evaluation of the entire talent training process by secrets

administrative departments has not been fully established. This leads to certain deviations between the talent skill and the latest development trends of national secrets work and the core competency requirements of positions. Secondly, the courses system of secrecy majors is imperfect. Most current secrecy professional curriculum systems rely on the original schools, with varying emphasis on courses from computer science, management, law, information security, and other disciplines. The course content focuses on traditional secrecy knowledge, with less coverage of challenges brought by emerging technologies such as artificial intelligence and blockchain. Core secrecy courses still cannot fully national latest secrecy demands and frontier technological issues in the secrecy field, resulting in a disconnect between university teaching and societal needs.

Lastly, the professional practice and internship system is incomplete. In the current cultivation of secrecy professionals, due to the special nature of the secrecy experimental and practical training environment and equipment, secrecy professional experiments and practical training face challenges such as insufficient equipment/tools and lack of secrecy engineering experience among trainers. The limited practical activities based on dispersed courses cannot systematically support the cultivation of practical innovation ability. Student internships mainly rely on on-campus experiments and short-term external visits or observations. Due to the specification of secrecy work and the non-cleared status of students, internship channels are narrow, unable to support students' full understanding of industry needs.

## **3. Construction of the Three Integration Mode for Confidentiality Majors through “Strategy-Education, Science-Education, Industry-Education”**

To address the aforementioned problems, we have constructed a new three integration mode for confidentiality majors composed of “Strategy-Education Integration, Science-Education Integration, and Industry-Education Integration” (see Figure 1). This framework systematically explains the internal logic and operational mechanism of the threeintegration training model. “Strategy-Education Integration” is the top-level design and fundamental guarantee, while “Science-Education Integration” and

“Industry-Education Integration” are the two wings and implementation paths. Together, they form an educational system with unified objectives, resource sharing, and complementary

advantages, consisting of five layers: the Driving Layer, the Objective Layer, the Pathway Layer, the Support Layer, and the Output Layer.



**Figure 1. Three Integration Mode for Confidentiality Majors Composed of “Strategy-Education Integration, Science-Education Integration, and Industry-Education Integration”**

The Driving Layer identifies the educational entities. With the university (Shandong Secrecy College of Qilu University of Technology) as the implementer of talent training, through integration with the Strategy (national and local secrecy administrative departments) for leadership and guidance, it jointly determine trains objectives, standardizes the curriculum system, injects Strategy and practical resources, and evaluates the quality of talent training, ensuring the political nature and direction of talent cultivation. Through integration with secrecy industry enterprises for collaborative drive, it incorporates industry needs, technical standards, and enterprise projects into teaching, providing authentic practical scenarios, forming a synergistic driving force and constituting a closed-loop collaborative training entity for secrecy professionals. It designs and implements the schemes and execution of educational measures such as training objectives, training paths, method implementation, and evaluation supervision from the top level.

The Objective Layer embodies the starting point and destination of the training model, jointly formulated by the university as the implementer, integrated with secrecy administrative departments and secrecy industry enterprises, i.e., to cultivate high-quality interdisciplinary secrecy professionals capable of addressing the challenges of secrecy work in the new era.

The Pathway Layer is the central link for implementing the three integration concept. It translates the strategic cooperation of the “Strategy, Science, Industry” from the Driving Layer into three executable and evaluable core initiatives. Initiatives such as co-building training schemes and curriculum systems, co-constructing practical platforms and training environments, and co-cultivating dual-qualified faculty teams are advanced in parallel and support each other, collectively transforming the blueprint of collaborative education into specific action routes.

The core of the Support Layer lies in organically embedding the resources of the “Strategy, Science, Industry” into the complete academic cycle of students from enrollment to graduation, forming an immersive educational ecology characterized by progressive objectives, cohesive content, and continuous reinforcement.

The Output Layer is the outcome manifestation of the entire training model, ultimately forming three core competencies in the talents. The cultivated talents can use political judgment to set the direction, use technological innovation to solve problems, and finally use job competency to efficiently complete missions. This strongly proves the effectiveness and necessity of the “three Integration” Secrets Talents Cultivation mode, achieving the fundamental goal of supplying reliable builders and successors for

the secrecy cause.

#### **4. Cultivation Path for Secrets Talents Based on the “Three Integration” Mode**

##### **4.1 Reconstructing the “Three Integration” Cultivation Scheme and Curriculum System for Secrecy Majors**

A professional construction steering committee composed of the Shandong Provincial Secrecy Bureau, the college academic committee, and leading secrecy enterprises was established. The committee holds regular meetings to jointly determine training objectives, jointly design the curriculum system, and jointly determine core competency requirements based on national secrecy strategies and regional industrial development needs.

The talent training objective for the secrecy major is defined as follows: Based on the strategic needs of national secrecy work, cultivate well-rounded talents with moral, intellectual, physical, aesthetic, and labor education, possessing firm political conviction, strong secrecy awareness, and good professional ethics. They should systematically master core knowledge in secrecy theory, information security, cryptography technology, etc., possess practical abilities in secrecy plan design, risk assessment, technical protection, etc., and be capable of engaging in secrecy management, technology research and development, and security protection in Strategy agencies, military-industrial enterprises, and the information technology sector, high-quality innovative secrecy professionals. Specific requirements include: firstly, possessing a high degree of political loyalty and responsibility, strictly adhering to secrecy discipline; secondly, mastering cutting-edge theories and technical methods in the secrecy field, possessing potential for scientific research and innovation; thirdly, being familiar with actual industry needs and capable of solving practical secrecy operational problems in complex scenarios.

According to the training objectives and graduation requirements, the curriculum system is designed and divided into four major categories: The first is computer foundation courses, such as programming, computer networks, etc. The second is information security courses, such as cryptography, network security, etc. The third is characteristic secrecy technology courses, such as Secrecy Law,

Secrecy Principles and Technology, Secrecy Inspection Technology, Electromagnetic Information Leakage and Protection, Classification Theory, etc. The fourth is internship and practical courses, such as Electronic Information Secrecy Technology Training, Network Secrecy Technology Training, Cloud Platform Secrecy Technology Training, etc. The interrelationships between different courses are determined, and a 2024 version of the secrecy professional curriculum system map is formulated, providing effective closed-loop support for the cultivation of secrecy professionals, ensuring the achievement of training objectives, and comprehensively improving the quality of talent cultivation.

##### **4.2 Building “Three Integration” Teaching Resources for Secrets Talents Cultivation**

With the guidance and assistance of the secrecy administrative departments, co-constructed the “Secrecy Law” course. In its first year, a division chief from the Shandong Provincial Secrecy Bureau served as the lead instructor, paired with a teaching assistant from the university to jointly develop the course teaching content, teaching methods, and evaluation methods. This approach allows students' understanding of secrecy law to extend beyond classroom knowledge to focus on practical application cases in actual secrecy law enforcement work, improving their cognitive level and professional application ability.

Deepen the integration of scientific research into all aspects of talent cultivation. Actively transform cutting-edge academic achievements into teaching resources integrated into classroom teaching in instructional design. Promoted the deep integration of courses such as “Secrecy Principles and Technology” “Biometric Recognition Technology” and “Malicious Code Detection” with scientific research, forming a teaching case library and enhancing the scientific and forward-looking nature of the courses.

Deepen cooperation with Zhongfu Information Technology Co., Ltd. to co-construct secrecy professional courses. Introduced the industrial application product “SM Personnel Management System” from Zhongfu Information Technology Co., Ltd. into the “Introduction to Secrecy Management” course, implementing deep industry-education integration. This enables students to recognize real-world application cases of their professional theoretical knowledge

in industry enterprises, enhancing their problem-solving ability and achieving the integration of knowledge and practice.

#### **4.3 Building a “Strategy-Lead, University-Main, Enterprise-Participated” Internship and Practice Platform**

To ensure the effective implementation of secrecy professional internships and practice, we have built a training center within the Secrecy College and several experimental platforms for the secrecy major, such as the “Information Security Cloud Experiment System” “Network Attack and Defense Competition Training Subsystem” and “Complex Network Virtualization Emergence and Security Drill Subsystem”, virtual simulation experiment projects were designed, including four major experiment items: “Cloud Secrecy Security Attack and Defense Virtual Simulation Comprehensive Experiment” “Simulation of Attack Chain Based on ATT&CK under Cloud Platform Virtual Simulation Comprehensive Experiment” “Double-Layer Intranet Penetration Virtual Simulation Experiment” and “Web Service Penetration Simulation Experiment”. These provide students with opportunities for practical operations in secrecy security attack and defense drills, security incident response, etc., in a highly realistic virtual experimental environment, enhancing their practical ability in secrecy security.

Jointly built off-campus internship and training bases with secrecy administrative departments, such as the “Shandong Provincial Secrecy Education and Training Base (Weihai)” and the “Shandong Secrecy College Education Practice Base” to carry out cooperative exchanges. Signed strategic cooperation agreements with Zhongfu Information Co., Ltd., established practical teaching bases, and jointly applied for specialized and sophisticated SME industrial colleges, etc. Through the combined effect of on-campus experimental platforms and off-campus internship and training bases, students’ practical operation ability is improved, and organic integration and mutual promotion of in-class and extra-curricular teaching are achieved.

#### **4.4 Cultivating a “Two-Way Flow” and “Dual-Qualified” Faculty**

Implement the measure of “inviting instructors”, establish a “Secrecy Instructor” system,

appointing business backbone staff from provincial and municipal secrecy bureaus as part-time teachers to regularly teach practical courses such as “Secrecy Law” and “Classification Theory and Practice” at the university. Implement the “sending teachers out” system, implement a “Teacher Industry Secondment” plan, regularly selecting young teachers for full-time or part-time training at provincial secrecy bureaus or secrecy-qualified units, participating in actual work, and accumulating practical experience.

#### **4.5 Optimizing the “Whole-Process, Immersive” Education Process Supported by the Three Integration**

Promote a whole-process, immersive educational process implemented by the university, guided by secrecy administrative departments, and coordinated by industry enterprises. It mainly includes,

**Enrollment Stage:** Invite leaders from secrecy administrative departments to deliver the “First Lesson on the Secrecy Cause” organize visits to secrecy warning education bases, and other activities to strengthen professional identity and vocational sacredness.

**Foundation Consolidation Stage:** Systematically introduce declassified cases provided by the Secrecy Bureau into the curriculum for project-based teaching. Simultaneously, implement an “Undergraduate Research Tutorial System” to guide students into research teams, expose them to cutting-edge secrecy technology, initially connect theoretical knowledge with industry practice and research problems, and cultivate innovative thinking.

**Practical Training Stage:** Students enter the university-enterprise co-constructed “Secrecy Training Base” to complete comprehensive projects using previously acquired knowledge in a highly simulated environment. Meanwhile, participate in disciplinary competitions guided by the Secrecy Bureau to realize the transformation of knowledge into ability and temper professional literacy through teamwork.

**Graduation Internship Stage:** Students enter secrecy-qualified units for capstone internships. Their graduation projects strictly follow the principle of “one student, one topic, real topic, real doing”, directly sourced from the actual needs of cooperative units, and completed under the joint guidance of internal and external supervisors. This ensures that students always

grow in an environment integrating political requirements, research atmosphere, and industrial scenarios, ultimately achieving the goal of cultivating high-quality interdisciplinary secrecy professionals.

### **5. Practical Effectiveness of the Three Integration Model for Secrets Talents Cultivation**

After several years of exploration and practice, the “Strategy-Education, Science-Education, Industry-Education” three integration mode has achieved remarkable results in Shandong Secrecy College of Qilu University of Technology, showing significant improvement in student training quality, professional development level, and social service capacity.

Firstly, Students’ Core Competitiveness and High-Quality Employment is Achievement. The three integration mode effectively bridges the gap between talent supply and job demand. Graduate data shows that the student employment rate has remained above 98%, with a further education rate reaching 48.15%, many of whom are admitted to prestigious 985 and 211 Project universities. Over 40% of graduates enter public service sector, secrecy administrative departments at various levels, and core secrecy-qualified units for work, with the high-quality employment rate ranking among the top in the university. In high-level disciplinary competitions such as the National College Student Information Security Contest and the Meiya Cup Electronic Data Forensics Competition, students have cumulatively won over 100 national and provincial/ministerial awards. Undergraduate students have published more than 10 academic papers, fully demonstrating their excellent innovative practical ability. Follow-up surveys from employers indicate that graduates are high in political literacy, quick to get started, solid in skills, and reliable in loyalty, with strong potential for career development.

Secondly, College Construction and Formation of a Characteristic Development Path has developed. Through the three integration platform, the college's disciplinary professional construction and faculty team building have achieved leapfrog development. The college has successively signed strategic cooperation agreements with 8 units including the Shandong Provincial Secrecy Bureau, jointly obtained nearly 10 provincial-level or above teaching

reform and research projects, co-built 3 provincial-level first-class courses including “Secrecy Technology Inspection” and co-developed “dual-qualified” teachers. A “Secrecy Instructor” team composed of internal academic backbone and secrecy industry experts has taken shape, providing core guarantee for the sustainable development of talent cultivation.

Lastly, the Capacity to Serve National Strategy, Contributing to Regional Secrecy Cause has been enhanced. The successful practice of this model has made the college an important pivot for serving secrecy work in Shandong Province. Relying on the co-construction platform, the college has provided technical consulting and training services exceeding 1,000 person-times for secrecy administrative departments and enterprises/institutions within the province, realizing a virtuous cycle of “teaching-research-service”. The demonstration effect of the college, as the second provincial-level secrecy college in China, is initially emerging. Its experience provides a replicable and promotable valuable paradigm for similar institutions, contributing indispensable wisdom and strength to strengthening the secrecy defense line in Qilu.

### **Acknowledgments**

This work was supported by the Shandong Province Teaching Reform Research Projects (M2022053, M2022126) and the Qilu University of Technology Teaching Reform Research Projects (p202202, 2022zd01, z202204).

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